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Charles W Badger

PROCEEDINGS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION

AT THE

Twenty-ninth Annual Meeting.

HELD IN KANSAS CITY, MO., AUGUST, 1881.

ALSO THE

CONSTITUTION, BY-LAWS, AND ROLL OF MEMBERS.

PHILADELPHIA:
SHERMAN & CO., PRINTERS.
1882.

Officers of the Association.

1881-82.

PRESIDENT.

P. W. Bedford, ... New York, N. Y.

FIRST VICE-PRESIDENT.

Emlen Painter, ... San Francisco, Cal.

SECOND VICE-PRESIDENT.

George Leis, ... Lawrence, Kans.

THIRD VICE-PRESIDENT.

John F. Judge, ... Cincinnati, Ohio.

TREASURER.

Charles A. Tufts, ... Dover, N. H.

PERMANENT SECRETARY.

John M. Maisch, ... Philadelphia, Pa.

LOCAL SECRETARY.

Hiram E. Griffith, ... Niagara Falls, N. Y.

REPORTER ON PROGRESS OF PHARMACY.

C. Lewis Diehl, ... Louisville, Ky.

Standing Committees.

Committee on Drug Market.

Louis Lehn (Chairman),	New York.
James G. Steele,	San Francisco, Cal.
Philip C. Candidus,	Mobile, Ala.
Thomas Whitfield,	Chicago, Ill.
John P. Muth,	Baltimore, Md.

Committee on Papers and Queries.

J. U. Lloyd (Chairman),	Cincinnati, Ohio.
Starr H. Ambler,	New York, N. Y.
William W. Bartlett,	Boston, Mass.

Committee on Prize Essays.

C. Lewis Diehl (Chairman),	Louisville, Ky.
John F. Judge,	Cincinnati, Ohio.
Emil Scheffer,	Louisville, Ky.

Committee on Legislation.

John M. Maisch (Chairman),	Philadelphia, Pa.
Samuel A. D. Sheppard,	Boston, Mass.
Charles Mohr,	Mobile, Ala.

Special Committee.

Committee on Entertainments.

George J. Seabury (Chairman),	New York.
Thomas J. Macmahan,	New York.
William H. Rogers,	Middletown, N. Y.

Council.

Members of the Council.

Term Expires.		
1882.	The Officers of the Association, *ex officio.*	
"	Thomas Whitfield,	Chicago, Ill.
"	William Saunders,	London, Ont.
"	Samuel A. D. Sheppard,	Boston, Mass.
1883.	Joseph P. Remington,	Philadelphia, Pa.
"	George W. Kennedy,	Pottsville, Pa.
"	Henry J. Menninger,	Brooklyn, N. Y.
1884.	William J. M. Gordon,	Cincinnati, Ohio.
"	John Ingalls,	Macon, Ga.
"	Joseph L. Lemberger,	Lebanon, Pa.

Officers of the Council.

Joseph P. Remington, Chairman. | W. J. M. Gordon, Vice-Chairman.
George W. Kennedy, Secretary.

Committees of the Council.

On Membership: George W. Kennedy, Chairman.
Henry J. Menninger,
John Ingalls,
Thomas Whitfield,
George Leis.
The Treasurer and Permanent Secretary of the Association, *ex officio.*

On Finance: Samuel A. D. Sheppard, Chairman.
Joseph L. Lemberger,
Charles A. Tufts,
Emlen Painter,
John F. Judge.

On Publication: Joseph P. Remington, Chairman.
C. Lewis Diehl,
William Saunders,
John M. Maisch,
W. J. M. Gordon.

On Centennial Fund: P. W. Bedford, Chairman.
S. A. D. Sheppard,
John M. Maisch.

List of Officers of the Association,

SINCE ITS ORGANIZATION.

(Deceased in Italics.)

PRESIDENTS.

Daniel B. Smith,	Philadelphia,	1852–53
William A. Brewer,	Boston,	1853–54
William B. Chapman,	Cincinnati,	1854–55
John Meakim,	New York,	1855–56
George W. Andrews,	Baltimore,	1856–57
Charles Ellis,	Philadelphia,	1857–58
John L. Kidwell,	Georgetown, D. C.,	1858–59
Samuel M. Colcord,	Boston,	1859–60
Henry T. Kiersted,	New York,	1860–62
William Procter, Jr.,	Philadelphia,	1862–63
J. Faris Moore,	Baltimore,	1863–64
William J. M. Gordon,	Cincinnati,	1864–65
Henry W. Lincoln,	Boston,	1865–66
Frederick Stearns,	Detroit, Mich.,	1866–67
John Milhau,	New York,	1867–68
Edward Parrish,	Philadelphia,	1868–69
Ezekiel H. Sargent,	Chicago,	1869–70
Richard H. Stabler,	Alexandria, Va.,	1870–71
Enno Sander,	St. Louis,	1871–72
Albert E. Ebert,	Chicago,	1872–73
John F. Hancock,	Baltimore,	1873–74
C. Lewis Diehl,	Louisville, Ky.,	1874–75
George F. H. Markoe,	Boston,	1875–76
Charles Bullock,	Philadelphia,	1876–77
William Saunders,	London, Ont.,	1877–78
Gustavus J. Luhn,	Charleston, S. C.,	1878–79
George W. Sloan,	Indianapolis, Ind.,	1879–80
James T. Shinn,	Philadelphia,	1880–81
P. Wendover Bedford,	New York,	1881–82

FIRST VICE-PRESIDENTS.

George W. Andrews,	Baltimore,	1852–53
George D. Coggeshall,	New York,	1853–54
Henry T. Cummings,	Portland, Me.,	1854–55
Charles B. Guthrie,	Memphis, Tenn.,	1855–56

John L. Kidwell,	Washington, D. C.,	1856–57
James Cooke,	Fredericksburg, Va.,	1857–58
Edward R. Squibb,	Brooklyn, N. Y.,	1858–59
William Procter, Jr.,	Philadelphia,	1859–60
William J. M. Gordon,	Cincinnati,	1860–62
John Milhau,	New York,	1862–63
John M. Maisch,	Philadelphia,	1863–64
Richard H. Stabler,	Alexandria, Va.,	1864–65
George C. Close,	Brooklyn, N. Y.,	1865–66
Edward Parrish,	Philadelphia,	1866–67
Robert J. Brown,	Leavenworth, Kan.,	1867–68
Ferris Bringhurst,	Wilmington, Del.,	1868–69
Ferdinand W. Sennewald,	St. Louis,	1869–70
Fleming G. Grieve,	Milledgeville, Ga.,	1870–71
C. Lewis Diehl,	Louisville, Ky.,	1871–72
Samuel S. Garrigues,	East Saginaw, Mich.,	1872–73
William Saunders,	London, Ont.,	1873–74
Joseph Roberts,	Baltimore,	1874–75
Frederick Hoffmann,	New York,	1875–76
Samuel A. D. Sheppard,	Boston,	1876–77
Ewen McIntyre,	New York,	1877–78
Frederick T. Whiting,	Great Barrington, Mass.,	1878–79
T. Roberts Baker,	Richmond, Va.,	1879–80
George H. Schafer,	Fort Madison, Ia.,	1880–81
Emlen Painter,	San Francisco, Cal.,	1881–82

SECOND VICE-PRESIDENTS.

Samuel M. Colcord,	Boston,	1852–53
Alexander Duval,	Richmond, Va.,	1853–54
John Meakim,	New York,	1854–55
Charles Ellis,	Philadelphia,	1855–56
Frederick Stearns,	Detroit, Mich.,	1856–57
Samuel P. Peck,	Bennington, Vt.,	1857–58
James O'Gallagher,	St. Louis,	1858–59
Joseph Roberts,	Baltimore,	1859–60
William S. Thompson,	Baltimore,	1860–62
Eugene L. Massot,	St. Louis,	1862–63
Charles A. Tufts,	Dover, N. H.,	1863–64
Enno Sander,	St. Louis,	1864–65
Elijah W. Sackrider,	Cleveland, O.,	1865–66
Ezekiel H. Sargent,	Chicago,	1866–67
N. Hynson Jennings,	Baltimore,	1867–68
Edward S. Wayne,	Cincinnati,	1868–69
John H. Pope,	New Orleans,	1869–70
James G. Steele,	San Francisco,	1870–71
George F. H. Markoe,	Boston,	1871–72
Edward P. Nichols,	Newark, N. J.,	1872–73
John T. Buck,	Jackson, Miss.,	1873–74
William T. Wenzell,	San Francisco,	1874–75
T. Roberts Baker,	Richmond, Va.,	1875–76

Gustavus J. Luhn,	Charleston, S. C.,	1876–77
John Ingalls,	Macon, Ga.,	1877–78
Henry J. Rose,	Toronto, Can.,	1878–79
Joseph L. Lemberger,	Lebanon, Pa.,	1879–80
William S. Thompson,	Washington, D. C.,	1880–81
George Leis,	Lawrence, Kan.,	1881–82

THIRD VICE-PRESIDENTS.

C. Augustus Smith,	Cincinnati,	1852–53
Charles B. Guthrie,	Memphis, Tenn.,	1853–54
Joseph Laidley,	Richmond, Va.,	1854–55
Henry F. Fish,	Waterbury, Conn.,	1855–56
Henry T. Kiersted,	New York,	1856–57
A. E. Richards,	Plaquemine, La.,	1857–58
Robert Battey,	Rome, Ga.,	1858–59
Edwin O. Gale,	Chicago,	1859–60
Theodore Metcalf,	Boston,	1860–62
J. Faris Moore,	Baltimore,	1862–63
George W. Weyman,	Pittsburg, Pa.,	1863–64
Thomas Hollis,	Boston,	1864–65
Charles A. Heinitsh,	Lancaster, Pa.,	1865–66
John W. Shedden,	New York,	1866–67
Daniel Henchman,	Boston,	1867–68
Albert E. Ebert,	Chicago,	1868–69
Joel S. Orne,	Cambridgeport, Mass.,	1869–70
Eugene L. Massot,	St. Louis,	1870–71
Matthew F. Ash,	Jackson, Miss.,	1871–72
Henry C. Gaylord,	Cleveland, O.,	1872–73
Paul Balluff,	New York,	1873–74
Augustus R. Bayley,	Cambridgeport, Mass.,	1874–75
Christian F. G. Meyer,	St. Louis,	1875–76
Jacob D. Wells,	Cincinnati,	1876–77
Emlen Painter,	San Francisco,	1877–78
William H. Crawford,	St. Louis,	1878–79
Philip C. Candidus,	Mobile, Ala.,	1879–80
William Simpson,	Raleigh, N. C.,	1880–81
John F. Judge,	Cincinnati, O.,	1881–82

TREASURER.

Alfred B. Taylor,	Philadelphia,	1852–54
Samuel M. Colcord,	Boston,	1854–56
James S. Aspinwall,	New York,	1856–57
Samuel M. Colcord,	Boston,	1857–59
Ashel Boyden,	Boston,	1859–60
Henry Haviland,	New York,	1860–63
J. Brown Baxley,	Baltimore,	1863–65
Charles A. Tufts,	Dover, N. H.,	1865–82

RECORDING SECRETARIES.

George D. Coggeshall,	New York,	1852–53
Edward Parrish,	Philadelphia,	1853–54
Edward S. Wayne,	Cincinnati,	1854–55
William J. M. Gordon,	Cincinnati,	1855–59
Charles Bullock,	Philadelphia,	1859–60
James T. Shinn,	Philadelphia,	1860–62
Peter W. Bedford,	New York,	1862–63
William Evans, Jr.,	Philadelphia,	1863–64
Henry N. Rittenhouse,	Philadelphia,	1864–65
John M. Maisch,	Philadelphia,	1865–82

CORRESPONDING SECRETARIES.

William Procter, Jr.,	Philadelphia,	1852–53
William B. Chapman,	Cincinnati,	1853–54
William Procter, Jr.,	Philadelphia,	1854–57
Edward Parrish,	Philadelphia,	1857–58
Ambrose Smith,	Philadelphia,	1858–59
William Hegeman,	New York,	1859–60
Peter W. Bedford,	New York,	1860–62
John M. Maisch,	Philadelphia,	1862–63
Peter Wendover Bedford,	New York,	1863–66

LOCAL SECRETARIES.

Peter Wendover Bedford,	New York,	1866–67
Alfred B. Taylor,	Philadelphia,	1867–68
Henry W. Fuller,	Chicago,	1868–69
J. Faris Moore,	Baltimore,	1869–70
William H. Crawford,	St. Louis,	1870–71
Henry C. Gaylord,	Cleveland, Ohio,	1871–72
Thomas H. Hazard,	Richmond, Va.,	1872–73
Emil Scheffer,	Louisville, Ky.,	1873–74
Samuel A. D. Sheppard,	Boston,	1874–75
Adolphus W. Miller,	Philadelphia,	1875–76
Henry J. Rose,	Toronto, Can.,	1876–77
Jesse W. Rankin,	Atlanta, Ga.	1877–78
Eli Lilly,	Indianapolis, Ind.,	1878–79
Charles F. Fish,	Saratoga Springs, N. Y.,	1879–80
William T. Ford,	Kansas City, Mo.,	1880–81
Hiram E. Griffith,	Niagara Falls, N. Y.,	1881–82

REPORTER ON PROGRESS OF PHARMACY.

C. L. Diehl,	Louisville, Ky.,	1873–82

AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Appointed by the President, in compliance with the following resolutions:

Resolved, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.; such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

Resolved, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the great advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

Alabama,	P. C. Candidus. cor Dauphin and Cedar sts.,	Mobile.
Arkansas,	Geo. W. Cabell, Congress and Bull streets,	Hot Springs.
California,	James G. Steele, 521 Montgomery street,	San Francisco.
Dist. of Columbia,	Jno. A. Milburn, 1101 F street, N. W.,	Washington.
Connecticut,	Charles A. Rapelye, 605 Main street,	Hartford.
	Alonzo F. Wood, 2 Church street,	New Haven.
	Luzerne I. Munson, Apothecaries' Hall,	Waterbury.
Delaware,	Linton Smith, cor. Seventh and Market sts.,	Wilmington.
Georgia,	Theo. Schumann, Whitehall and Hunter sts.,	Atlanta.
	Robert H. Land, 270 Broad street,	Augusta.
	John Ingalls, cor. Fourth and Poplar sts.,	Macon.
	Fleming G. Grieve,	Milledgeville.
Illinois,	Henry W. Fuller, 24 Market street,	Chicago.
	David G. Plummer, 6 Main street,	Bradford.
	Albert E. Ebert, sugar refinery,	Peoria.
Indiana,	George W. Sloan, 7 East Washington st.,	Indianapolis.
	John F. Brandon,	Anderson.
	Jefferson S. Conner, 121 Pearl street,	New Albany.
Iowa,	Theodore W. Ruete, 379 Main street,	Dubuque.
	Olaf M. Oleson, Market street,	Fort Dodge.
	George H. Schafer, 129 Front street,	Fort Madison.
Kansas,	George Leis, 90 Massachusetts street,	Lawrence.
Kentucky,	C. Lewis Diehl, cor. Third and Broadway,	Louisville.
	Wm. H. Averill, 435 Main street,	Frankfort.
Louisiana,	Isaac L. Lyons, 42 Camp street,	New Orleans.
	Joseph G. Thibodeaux, Main street,	Thibodeaux.
Maine,	Noah S. Harlow, 4 Smith's Block,	Bangor.
	Edmund Dana, Jr., 373 Congress street,	Portland.

Maryland,	William S. Thompson, 8 W. Baltimore st.,	Baltimore.
	Thomas W. Shryer, 103 Baltimore street,	Cumberland.
Massachusetts,	S. A. D. Sheppard, 1129 Washington st.,	Boston.
	Joel S. Orne, 493 Main street,	Cambridgeport.
	B. Frank Stacey, 51 Vine street,	Charlestown.
	Frederick T. Whiting. Main street,	Grt. Barrington.
	Freeman H. Butler, 141 Central street,	Lowell.
	Benjamin Proctor, 6 Healey's Arcade,	Lynn.
	Samuel O. Daniels, Main and Summer sts.,	Natick.
	James E. Blake, 64 North Second street,	New Bedford.
	Joseph J. Estes, cor. Union and Church sts.,	Rockland.
	Thomas B. Nichols, 159 Essex street,	Salem.
	Charles P. Alden, 270 Main street,	Springfield.
	William Bush, 56 Front street,	Worcester.
Michigan,	Ottmar Eberbach, 12 South Main street,	Ann Arbor.
	William Johnston, 153 Jefferson avenue,	Detroit.
Missouri,	James F. Hurt, Broadway,	Columbia.
	William T. Ford, 1305 Cherry street,	Kansas City.
	William H. Crawford, 800 Washington av.,	St. Louis.
New Hampshire,	Bayard T. Perry, 1088 Elm street,	Manchester.
	E. S. Russell, 69 Main street,	Nashua.
New Jersey,	Albert P. Brown, cor. Fifth and Federal,	Camden.
	John B. Drake, 132 Broad street,	Elizabeth.
	Maxwell Abernethy, 188 Newark avenue,	Jersey City.
	Charles B. Smith, 831 Broad street,	Newark.
	Robert E. Parsons, 19 Main street,	Orange.
	William H. Voorhees, 21 West Front street,	Plainfield.
	G. A. Mangold, 4 East State street,	Trenton.
New York,	Daniel C. Robbins, 91 Fulton street,	New York.
	Charles A. Gaus, 202 Washington avenue,	Albany.
	G. C. Close, cor. Smith and Schermerhorn sts.,	Brooklyn.
	Charles O. Rano, 1872 Niagara street,	Buffalo.
	William L. Du Bois, 281 Main street,	Catskill.
	James T. King, cor. Main and South streets,	Middletown.
	H. S. Sherwood, 339 Main street,	Poughkeepsie.
	G. H. Haass, 38 Main street,	Rochester.
	John G. Bissell, 45 Dominick street,	Rome.
	Charles E. Fish, 114 Broadway,	Saratoga.
	George E. Duryee, 191 State street,	Schenectady.
	George S. Ballard, 198 Genesee street,	Utica.
	Robert J. Toplis, Getty square,	Yonkers.
North Carolina,	Addison S. Lee, 14 Fayetteville street,	Raleigh.
	James C. Munds, Third street,	Wilmington.
Ohio,	J. U. Lloyd, N. W. cor. Court and Plum sts.,	Cincinnati.
	William K. Foltz, 1465 Howard street,	Akron.
	Walter H. Howson, Water street,	Chillicothe.
	Henry C. Gaylord, 110 Monument square,	Cleveland.
	Charles Huston, 43 South High street,	Columbus.
	Thomas J. Casper, 41 East Main street,	Springfield.
	Charles Hohley, 248 South street,	Toledo.
	Edgar M. Hatton, Fifth and Main streets,	Zanesville.

Pennsylvania,	Rich. M. Shoemaker, cor. Fourth and Race,	Philadelphia.
	Edward T. Myers, 16 Main street,	Bethlehem.
	Jacob A. Miller, cor. Second and Chestnut,	Harrisburg.
	Charles A. Heinitsh, 16 East King street,	Lancaster.
	Joseph L. Lemberger, 8 North Ninth street,	Lebanon.
	Francis W. Walker, Jr.,	New Brighton.
	James B. Cherry, 23 Fourth avenue,	Pittsburg.
	Philip M. Ziegler, 526 Penn street,	Reading.
	Edward A. Cornell, Tenth and Pine streets,	Williamsport.
Rhode Island,	James H. Taylor, 104 Thames street,	Newport.
	Albert L. Calder, 163 Westminster street,	Providence.
South Carolina,	Gustavus J. Luhn, Post-office box No. 582,	Charleston.
Tennessee,	Jas. S. Robinson, cor. Third and Madison,	Memphis.
	John C. Wharton, 38 Union street,	Nashville.
Texas,	Lewis M. Connor, 502 Main street,	Dallas.
	Thomas W. Powell, 10 Houston street,	Fort Worth.
Virginia,	Frederick H. Masi, cor. Main and Granby,	Norfolk.
	T. Roberts Baker, 919 Main street,	Richmond.
West Virginia,	Edmund Bocking, 1 Odd Fellows' Hall,	Wheeling.
Wisconsin,	John R. Drake, 255 South Water street,	Milwaukee.
	Edward B. Heimstreet,	Janesville.
Prov. of Ontario,	George Hodgetts, 365 Yonge street,	Toronto.
Prov. of Quebec,	Henry R. Gray, 144 S. Lawrence Main st.,	Montreal.

LIST OF QUERIES.

TO BE ANSWERED AT THE THIRTIETH ANNUAL MEETING, 1882, TO BE HELD AT NIAGARA FALLS, N. Y.

QUERY 1. What are the best menstrua for use in making liquid vesicant and rubefacient preparations of Cantharides?

Accepted by George W. Sloan, Indianapolis.

2. Oil of Thyme of commerce is said to be very often deprived of its thymol. Is this statement true?

Accepted by Joseph L. Lemberger, Lebanon, Pa.

3. Lead plaster and other plasters of the United States Pharmacopœia get hard and brittle by keeping. How can their soft consistence, as when freshly made, be preserved?

Accepted by Hugo W. C. Martin.

4. It has been asserted that some pharmacists pay a percentage to physicians who send prescriptions to their stores. Is this true to any great extent? What is the feeling of the pharmacists of our country regarding the matter, and the feeling of physicians?

Accepted by Hugo W. C. Martin.

5. Examine and report upon the Creasote occurring in the American market.

Accepted by P. W. Bedford, New York city.

6. Examine and report upon the Tannates of Quinine of commerce.

Accepted by Charles F. Hartwig, Chicago.

7. Mixtures of Ferrocyanide and Carbonate of Potassium with Oxide or Oxalate of Iron have been recommended by Morgan (1854) and Zaengerle (1857) for the preparation of reduced iron. Can a good article of reduced iron be readily obtained by such or other process which would dispense with the use of hydrogen?

Accepted by E. S. Wayne, Cincinnati, Ohio.

8. Are commercial volatile oils adulterated to any extent? What is generally used as the adulterant?

Accepted by W. H. Crawford, St. Louis.

9. Ethereal oil of male fern deposits a sediment. Is the sediment or the overlying oil the desirable portion?

Accepted by Charles F. Hartwig, Chicago.

10. It is desired to ascertain the solubility of the officinal chemicals in alcohol of the specific gravity 0.941 at 15.5° C. = 60° F. and at its boiling-point. The method of examination should be stated.

Continued to P. C. Candidus, Mobile, Ala.

11. The alkaloid Berberine is by some writers claimed to be nearly insoluble, while others claim it to be freely soluble in water. This discrepancy in statements should be investigated.

Accepted by T. L. A. Greve, Cincinnati, Ohio.

12. It has been asserted that much difficulty has been experienced in cultivating some species of medicinal plants, owing to the failure of the seed to germinate. Would any special treatment of such seeds facilitate their germination?

Continued to William Saunders, London, Ont.

13. The bark of Rhamnus Purshiana contains a substance that is said to strike a red color with ammonia. What is this principle?

Continued to N. Rosenwasser, Cleveland, Ohio.

14. The history of Rhamnus Purshiana.

Continued to James G. Steele, San Francisco, Cal.

15. How do the commercial Bismuth preparations compare with the requirements of the United States Pharmacopœia?

Continued to P. W. Bedford, New York city.

16. Is the yellow principle of Berberis Aquifolium root identical with Berberine?

Continued to Frederick B. Power, Philadelphia.

17. What menstruum is best adapted to extract and hold in solution the desirable principles of Licorice-root?

Accepted by F. F. Prentice, Janesville, Wis.

18. What is the crystalline form of the white alkaloid of Hydrastis Canadensis (Hydrastia)? What is its formula?

Continued to Frederick B. Power, Philadelphia.

19. What percentage of the more important powdered drugs, ordinarily obtainable in the market, are of a reliable character and suitable for dispensing purposes?

Accepted by Charles B. Allaire, Peoria, Ill.

20. Describe the structure of the different varieties, or species, of Senega of commerce. It is particularly desirable that a thorough microscopic examination be made of the roots of authentic specimens of Polygala Senega and its varieties, and of Polygala Boykinii.

Accepted by E. B. Stuart, Chicago, Ill.

21. What is the alcoholic strength of the fluid extracts of commerce?

Accepted by Adam Conrath, Milwaukee.

22. Is Bitter Almond water as reliable as Cherry Laurel water? Should pharmacists feel at liberty to substitute the one for the other?

Accepted by P. C. Candidus, Mobile, Ala.

23. Is there any difference in the laxative properties of Rhamnus Purshiana bark and the bark of Rhamnus Frangula?

Accepted by E. S. Wayne, Cincinnati, Ohio.

24. What is the quality of the narcotic herbs of commerce?

Accepted by C. S. Hallberg, Chicago.

25. What is the strength of commercial Mercurial Ointment?

Accepted by George W. Kennedy, Pottsville, Pa.

26. What is the percentage of Hydroxide of Potassium in commercial white caustic potash?

Accepted by Adolf G. Vogeler, Chicago.

27. What is commercial Musk?

For general acceptance.

28. Is the Sulphate of Quinine imported into this country and sold in bulk equal to that of our manufacturers?

For general acceptance.

29. What difference is there in therapeutic usefulness between Citrine Ointment, United States Pharmacopœia, and an ointment made by simply mixing the proper quantities of solution of Nitrate of Mercury with the officinal proportion of fat and oil without applying heat?

Accepted by Adolf G. Vogeler and C. S. Hallberg, Chicago.

30. What is the average amount of caffeine in the Guarana of commerce as compared with that of the seed? Determine a rapid and pharmaceutically correct method for getting at the percentage of caffeine. Give the most desirable alcoholic menstruum that is adapted to the extraction of caffeine and the preparation of fluid extract of Guarana.

Accepted by J. H. Feemster, Cincinnati, Ohio.

CONTENTS.

REPORT ON THE PROGRESS OF PHARMACY.

REPORTS OF COMMITTEES.

SPECIAL REPORTS AND ESSAYS.

I. Pharmacy:

II. Chemistry:

III. Materia Medica:

MINUTES OF THE TWENTY-NINTH ANNUAL MEETING.

Minutes of the First Session:

Minutes of the Second Session:

Minutes of the Third Session:

Minutes of the Fourth Session:

Minutes of the Fifth Session:

APPENDIX.

PREFATORY NOTICE.

The present volume is published at a later date than had been expected, there having been delays from various causes beyond the control of the Publishing Committee. As for a number of years past, many of the woodcuts, used in illustrating the various subjects in this volume, have been loaned by the publishers of "New Remedies" and of the "American Journal of Pharmacy;" over forty cuts were obtained, at a small expense, through the aid of the publishers of the "Oil and Drug News;" and those used in illustration of the papers on Cypripedium and on the Apocynums were furnished by the publishers of the "Druggist."

The portrait selected by the committee as the frontispiece is an excellent phototype of the late Charles W. Badger, who, in January, 1877, died at Newark, New Jersey, at the age of sixty-three years. Born at Middletown, Connecticut, he learned the apothecary's business at Wethersfield, and, after a clerkship in New York, commenced business in Newark, which he conducted for thirty-five years. He was among the most active workers for organizing the pharmaceutical associations of New Jersey and of Newark, and took great interest in the National Association, the meetings of which he regularly attended, and of which he became the first life-member under the new rules. A biographical sketch of Mr. Badger will be found on page 489 of the Proceedings for 1877.

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All orders for Proceedings should be addressed to the Permanent Secretary, John M. Maisch, 143 North Tenth Street, Philadelphia, Pa.

The Thirtieth Annual Meeting will be held at Niagara Falls, New York, on the second Tuesday (12th day) of September next. Blank applications of membership may be obtained from the authorized agents or from the Permanent Secretary. Applications for membership should reach the Chairman of the Committee on Membership, George W. Kennedy, Pottsville, Pa., on or before September 1st; if sent later, they should be addressed to the Local Secretary, Hiram E. Griffith, Niagara Falls. The fees should be sent in postal money orders, in drafts, or in bank checks.

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PROCEEDINGS

OF THE

TWENTY-NINTH ANNUAL MEETING

OF THE

American Pharmaceutical Association.

REPORT ON THE PROGRESS OF PHARMACY.

FROM JULY 1, 1880, TO JUNE 30, 1881.

BY C. LEWIS DIEHL.

THE report submitted in the following will be found a fair exponent of pharmaceutic progress since the date of the last report to the Association. In accordance with the intention already expressed, the various subjects presented have been abstracted with the degree of brevity judged to be commensurate with their importance and to intelligent understanding; the reporter believing that, without being verbose, the abstracts should be sufficiently full to preclude the necessity of reference to the original, except for special investigations. It has likewise been his aim to improve the report in the more careful selection of the subjects to be abstracted; that is to say, to select only such subjects as are of immediate interest to pharmacy, and to avoid repetitions, either of subjects that have been previously noted in these reports to the Association, or that have been long recognized as established facts. But this is more easily aimed at than accomplished; for the literature to select from is so widespread and voluminous, and the tendency to reproduce articles—in abstract or in full—is so great, that one has to be continually on the alert to avoid repetition. Moreover, editors, in many instances, fail to give the *original* source of the article abstracted or reproduced (though they may give the *immediate* source), and as a consequence it is by no means unfrequent that a paper, starting in one section of the world, may make the round of all the journals, becoming reduced in volume by successive abstractions, and finally return, perhaps after years, possibly also more or less changed, to its original source as something quite new. Under these circumstances it cannot be surprising if the report now and then contains repetitions, notwithstanding the care exercised; though the circumstance that the work has been intrusted to the present reporter for so many successive years, in a great measure prevents their more frequent occurrence. And while on the subject of selection of matter suitable for the report, it may be well to draw attention to a class of subjects which the reporter considers his duty to ignore emphatically. This class embraces those medicaments that bear the impress of proprietary character, whether their composition be known, or made known, or not; excepting, of course, such preparations, the formulas for which are made known, in good faith, for the eventual use of pharmacists. Obviously these medicaments should find no place in a report that is devoted to pharmaceutic progress, for they are, with few exceptions, rather indicative of pharmaceutic (or perhaps better, therapeutic) degeneration. The same rigorous rule cannot be applied to the current pharmaceutical literature; though even here it would be well if greater circumspection were exercised. For it is surprising how liberally this subject is handled in some of the journals. Formulas are given,—generally copied from medical journals, however,—in which the specialties of the favored manufacturer find a prominent place, notwithstanding the fact that nothing is known of their composition except the assurance or advertisement of the manufacturer, that they represent certain medicinal agents in a particularly felicitous combination. And this kind of rubbish is by no means confined to the American journals, though American manufacturers are in a large degree responsible for the material.

Another class of literary productions that requires rather close scrutiny, embraces those papers in which the intention is evident to laud the otherwise legitimate preparations of certain houses. Papers of this nature, though comparatively rare on this side of the Atlantic, are not at all of unfrequent occurrence in the German journals; and these are less easily avoided, because their real purpose is generally covered by a mass of scientific discussion that is calculated to mislead. It may, therefore, occur that an article which has no business in this report may find its way into it, while, on the other hand, a misconception of the purpose may now and then exclude one that would deserve notice.

In conformity with the opinion expressed in last year's report, the reporter has again omitted a series of the principal subjects abstracted for this. The arrangement of the report is so simple that such a review—being mainly a repetition of what is contained further on—appears to him to be superfluous. Possibly the arrangement of the report might be still further simplified, so as to bring allied subjects more closely together, and if on mature consideration a change in this direction will be found feasible and desirable, it will be made.

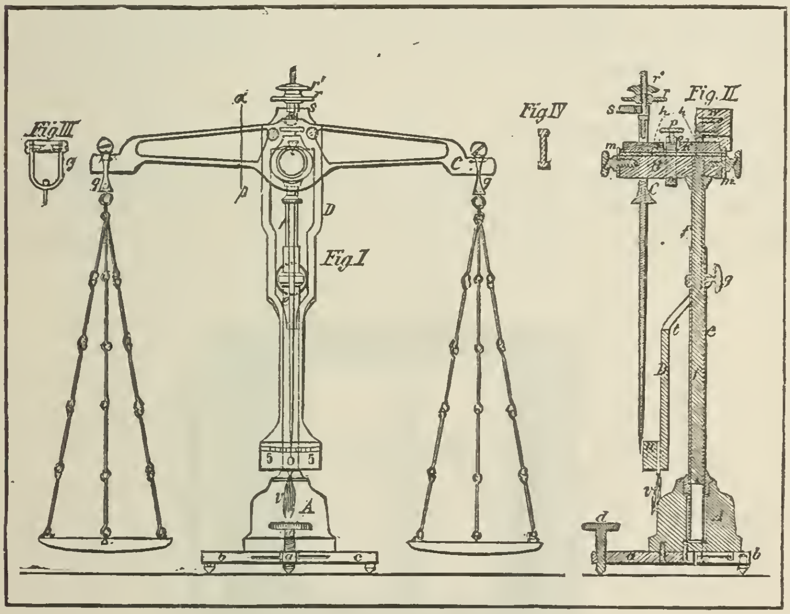
PHARMACY.

A. APPARATUS AND MANIPULATIONS.

Weights, Measures, Specific Gravity, etc.

Improved Balance.—Westphal has constructed the new balance, illustrated by the accompanying cut (Fig. 1.), with a view to facilitate its being put into correct position on any kind of table, and to insure accuracy and certainty in weighing. It has, therefore, the sensitiveness of an analytical balance, permitting fractions of milligrams to be read off, so far as this can be done in the open air, and may be loaded up to 250 grams (8 troy ℥), indicating differences from 1 to $\frac{1}{10}$ milligrams, according as it is covered by a case, or not. The balance, which consists of the pillar, scale-bearer, beam, scale-pans, and suspending arrangement, is illustrated in the accompanying cut.

Fig. 1.



Westphal's Improved Balance.

I is a front view; II a sectional view through the central axis, as seen from the right side; III a lateral view of the suspended scale-pan; IV a section of the beam in the direction of the line $\alpha\ \beta$.

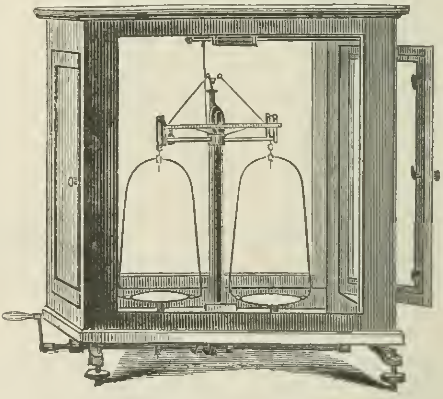
The scale rests upon three arms, one of which carries a set-screw, while the other two may be turned in any direction, and, when it is desired to pack the scale away, may be brought around so as to lie close to the arm *a*.

The hollow pillar *e* is firmly screwed into the socket *A*, and within it is placed a rod *f*, carrying the beam, etc., which may be raised or lowered as may be required, and may be held in any position by a screw (*g*, II). The rod *f* carries at its upper end the cylindrical piece *B*, upon which is fastened the hard plate *h*. Upon this latter rest, and may freely turn, both the beam itself, by its knife-edge *i*, and the scale-bearer *D*, by its knife-edge *h*. The guard-plates *m m* and *n o*, prevent a displacement of the knife-edges forward or backwards.

The scale-bearer *D* being thus free to turn upon the same level as the beam, it follows that, in a state of perfect equilibrium, the index will point to the exact centre of the scale, even though the balance should not stand upon a perfectly level place. As soon as the different parts have once been put together, and the balance is put upon the place where it is intended to be used, the scale-bearer will vibrate to and fro until it has come to rest, which is hastened by the gentle friction of a camel's hair pencil. The turning of the beam, caused by actual weighing, has no further influence upon the scale-bearer.—New Rem., October, 1880, p. 297.

Short-armed Analytical Balance—Simplification of Mendelejeff's Construction.—Bunge has simplified the construction of the short-armed analytical balances, originally recommended by Professor Mendelejeff (see *Proceedings*, 1876, p. 50), which is illustrated by Fig. 2. The beam is composed of different pieces of light metal, whereby a smaller amount of expansion is secured. The short beam and long index facilitate rapid weighing, and greater sensibility when fully loaded.

FIG. 2.

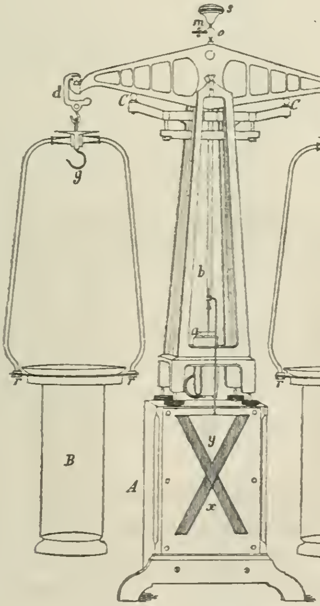


Bunge's Analytical Balance.

The stops are of the usual modern construction, being so arranged that the knife-edges are lifted off their agate beds at one motion, while the arrest of their scale-pans is removed by another. The metallic parts are protected from oxidation by suitable coatings, the beam and arm being usually gilt or silvered, while the scale-pans are platinized. The mahogany case, with marble bottom, rests on three set-screws, and the weights and load are introduced from the sides, an arrangement which prevents the access of heat and moisture from the breath of the operator. The balances are manufactured by August Müller, of Berlin, in three sizes (for loads of 200, 500, and 100 grams), and turn, when fully loaded, with $\frac{1}{5}$th milligram. If desired, attachments for taking specific gravity are furnished with the balances.—New Rem., September, 1880, p. 271, from Pharm. Ztg., No. 55, 1880.

Analytical and Experimental Balance.—Mr. Albert Ruprecht, of Vienna, manufactures a new balance which is specially constructed for illustrating lectures, where it is important that the swinging or deviation of the index of the balance should be seen at a considerable distance.

FIG. 3.



Ruprecht's Lecture Balance.

The balance differs in certain respects from those previously in use. When it is to be used for analytical purposes, and not for lectures, the balance may be set directly upon a table, and in place of the long glass cylinders *BB*, ordinary scale pans are used. The index *b* in this case ends at the point, near *a*, and does not carry the prolongation shown in the cut. As will be seen, the index-needle *b* passes through a stirrup *C*, instead of being placed on the outside. When the balance is to be used for lecturing purposes, it is placed upon a wooden stand *A*, having three bearings. Upon the front side of this stand or box, which is that facing the audience, a piece of white paper with a black triangle **Λ** drawn upon it is fastened. The index-needle is connected with a prolongation (see cut) bearing at its lower end a triangular piece of white paper, the outer edge of which is marked with a black outline of the letter **V**, corresponding to the upper half of the letter **X** upon the box. When the balance is in equilibrium, the figures coincide, and the figure visible to the audience will be a black, bold, and clearly distinguishable **X**. The slightest disturbance of the equilibrium, so slight that it would scarcely be noticed at the index-needle, becomes at once most plainly visible, even at a distance, by a distortion of the letter **X**. Equilibrium is regulated by means of a small brass ball *o*, bored eccentrically, and bearing besides a movable screw *m*. Rough adjustment is accomplished by turning *o*, and fine adjustment by means of *m*. The two glass-cylinders *B B* may be applied either upside down, as shown in the cut, for illustrating the different weight of gases, etc., or else turned the other way. The disturbance of the centre of gravity by the attachment of a prolongation to the index-needle is counteracted by turning the screw S upwards. —New Rem., December 1880, p. 358.

Weights, Measures, etc.—Defects and Remedy.—Professor Redwood, at an evening meeting of the British Pharmaceutical Society, in February (1881), read a very exhaustive paper on the subject of weights, balance, and measures employed in pharmacy, their defects, and the remedy. The author discusses this subject particularly in its bearings upon the Weights and Measures Act of 1878, but in this connection throws out many valuable suggestions. Regarding weights he observes that, while it is advisable and under existing conditions in Great Britain, even necessary that they should deviate in the direction of excess from the standard, such excess should never exceed the following quantities:

On ½ grains, 0.02; on 1 grain to ℈ss., 0.05 grain; on ℈i to ʒiv, 0.10 grain; on ℥i to ℥x, 0.25 grain. The careful pharmacist will do well to keep a set of weights for the exclusive purpose of testing those in daily use. But this is work that cannot be done without the use of a suitable balance,—one sensible to the hundredth or at least the fiftieth of a grain,—and this, together with a set of accurate weights, such as are used for analytical purposes, should be looked upon as essential appendages to every pharmaceutical establishment where medicines are dispensed. With regard to graduated measures, there are many difficulties in the way of securing accurate measures, and, even if these are absolutely accurate, to measure accurately. The best results obtained in that direction are but approximations to strict accuracy. It is a common error to make too many graduations on the same measures, and this applies particularly to conical measures, which are sometimes graduated up to 120 or 240 minims, with marks for every 5 minims carried up to parts of the glass where the surface of the contained liquid being over half an inch in diameter, it is impossible to measure with accuracy. In measures of this description Professor Redwood recommends no graduation below 10 minims, and then to progress by tens up to 30 minims, passing from 30 to 60, and thence to 90 and 120, without any intermediate marks; and this is high enough to go with a measure on which minims are marked. For measuring small quantities accurately constructed pipettes give the best results, and one of the best for this purpose is the *syringe pipette* (see Fig. 4), originally suggested by Mr. Alsop and subsequently modified by Mr. Ashton, by reducing the diameter of the graduated part of the tube so that each minim should occupy the tenth part of an inch or even more if desired. Small open pipettes (Fig. 5) to be worked with the finger, and graduated to 5 or 10 min-

FIG 4.

Syringe Pipette
(full size).

FIG. 5.

Minim Pipette
(full size).

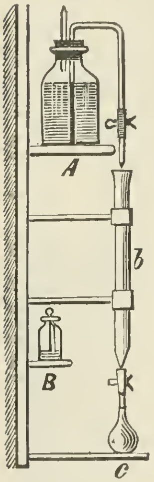
FIG. 6.

Minim Tube
(full size).

ims,* each minim occupying half an inch, are among the instruments of greatest precision used by dispensers for measuring liquids. Minim tubes of the ordinary cylindrical form but of smaller diameter, as shown in the drawing (Fig. 6), are also used with advantage if accurately constructed. It is important, however, in using these small tubes, to ascertain that the inner surface of the tube is in a condition in which the liquid will freely and uniformly adhere to the glass and flow over it. To insure this the surface of the glass should be clean and not too dry. If the surface should have any oily or resinous matter on it or if it be too dry, the liquid (water), instead of adhering will be repelled, and the surface become convex instead of concave.—Phar. Jour. Trans., February 12th, 1881, pp. 673–678.

Practical Apparatus for Titration.—Pharm. Centralhalle (February 17th, 1881, p. 81), draws attention to the apparatus shown in the cut (Fig. 7), which, primarily intended for zinc-titrations (tin-titrations? Rep.), may be applied to all titrations that require to be frequently made. The arrangement requires very little explanation. The upper shelf *A* holds the flask containing the reagent; the smaller shelf *B* (which may be omitted), is intended for incidental reagents; the lowest shelf *C* is used for the reception of flasks, capsules, etc., into which the liquid to be titrated is placed. The burette is fastened to the wall as shown at *b*, and is filled as may be required from the reservoir above.

Fig. 7.



Apparatus for Titration.

Burettes, Pipettes, and other Measuring Tubes.—Mr. C. Scheibler gives explicit directions for constructing burettes, pipettes, and other measuring tubes, which, owing to their unreliability and incorrectness as usually furnished in the market, should at least be verified if not constructed by those using them. His paper, accompanied by illustrations, is communicated to Jour. für Prakt. Chem. (76, 180), and is reproduced in New Rem., January, 1881, p. 10.

Burette—Improved Construction.—Mr. Pellet has proposed an improvement, the peculiar feature of which consists in a solid glass ball, which serves the purposes of a faucet (Fig 8). Others have heretofore recommended the insertion into the rubber joint at the bottom of the burette of a short piece of solid glass rod of a slightly larger diameter than the calibre of the tube. A globe, however, is preferable, since it can be more easily retained in place, and, if desired, can be moved up or down with greater facility. It is only necessary to

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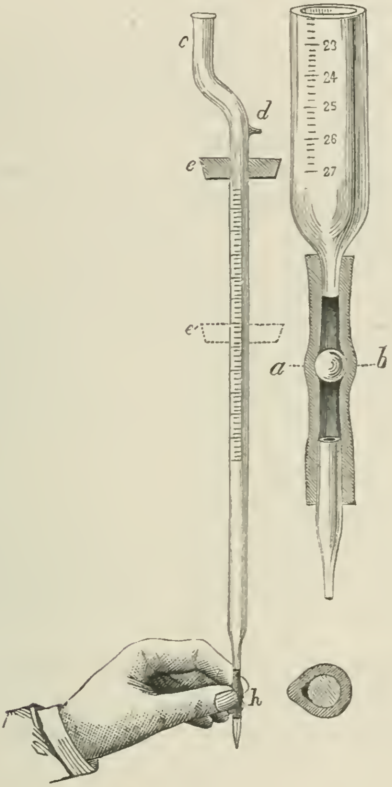
* Similar tubes have been recommended by Dr. E. R. Squibb (see Proceedings, 1873, 542).

gently pinch the rubber tube at one side, to cause a flow of liquid, in a fine stream or in drops, from the burette.—New Rem., May, 1881, p. 141, from Le Moniteur de la Photogr.

FIG. 8.



Pellet's Burette.

Equivalence of Drops.—Mr. S. L. Talbot has made a large number of experiments (with no less than 275 different liquids), the object of which was to determine, if possible, some relation between the size of the drop and a minim of the same liquid. His results accord very closely with Durand's and Bernouilli's statements. Strict rules cannot be laid down as to the corresponding size of drops of classes of preparations, though the volatile oils, tinctures, spirits, oleo-resins, and fluid extracts may be grouped together as yielding drops usually less than one-half the size of drops of water. Solutions, syrups, and dilute acids afford drops but slightly smaller than water, excepting solution of nitrate of mercury and syrups containing fluid extracts. Acids, wines, fixed oils, vinegars, and mixtures give, in most cases, drops of more than one-half the size of water, about two thirds. The following table shows the author's results:

Average Size of Drops of Classes of U. S. P. Preparations.

Class.	Average No. of drops in f℥i.
Ether and stronger ether,	174
Fluid extracts,	141
Spirits,	141
Tinctures,	136
Volatile oils,	131
Oleo-resins,	124
Acids (3 exceptions),	123
Wines,	106
Fixed oils,	103
Syrups containing fluid extracts,	97
Mixtures,	89
Vinegars,	77
Syrups not containing fluid extracts,	69
Solutions (1 exception),	66
Diluted acids,	61
Exceptions.	
Solution of nitrate of mercury,	131
Nitromuriatic acid,	76
Muriatic acid,	70
Sulphurous acid,	59

—Am. Jour. Phar., July, 1880, p. 337.

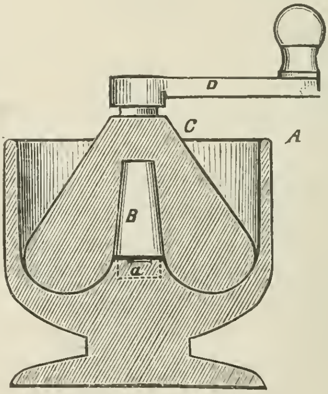
Specific Gravity and Increase of Volume.—Mr. William Clay Smith has determined the specific gravity of a large number of solids both in their dry condition and in solution, and has noted them, together with the increase of volume observed when dissolving them in variable quantities of water. The results are given in tabular form in Am. Jour. Phar., April, 1881, p. 145–148.

Dilatometer.—Mr. Gustavus Pile describes a new form of dilatometer, an instrument which is mainly intended to show the amount of dilatation or contraction of a liquid as the temperature is either increased or diminished. See Am. Jour. Phar., May, 1881, p. 225.

MECHANICAL DIVISION, PRECIPITATION, ETC.

A New Mortar.—Mr. Joshua S. Buck has patented a mortar (Fig. 9), which is intended by the patentee to facilitate the amalgamation of ores, but which might well serve certain pharmaceutical and other

FIG. 9.



Buck's New Mortar.

purposes. It consists of a mortar, the bottom of which has an upwardly projecting central shoulder or swell, having a socket for the reception of the shouldered lower end of a removable shaft, which is journalled in a central opening in the muller. The latter is made to revolve by means of a crank, as shown, or by any other suitable contrivance. The post *B*, keeping the muller revolving upon a true centre, secures a uniform wearing surface and renders the rubbing process more complete and rapid than is the case with an ordinary pestle.—New Rem., February, 1881, p. 40.

A New Mixing Machine.—Mr. Charles Rice describes an apparatus, by the aid of which admixtures of powdery substances may be rapidly and perfectly effected. The upper half cylinder fits snugly into a groove contained in the edge of the other half cylinder. The apparatus is mounted in a wooden frame, which serves to steady it and also to protect it from injury. The apparatus in use by the author has a capacity of about 8 gallons; having a diameter of 11 inches and a length of 20 inches. A ¾-inch gas pipe forms the axle, through which pass 7 pieces of ¼-inch wire, bearing paddles on each end, which are turned in opposite ways.—New Rem., June, 1881, p. 168.

Apparatus for Washing Precipitates.—In several devices heretofore constructed to effect the automatic washing of precipitates, the requisite wash fluid was supplied by a continuously acting siphon, so that the filters were always kept filled up to a certain point. But it is well known that an intermittent washing has the advantage of saving both time and liquid; and to this end, Jean de Mollins has introduced some modifications. A flask provided with a Mariotte's tube contains the washing fluid, and this, during the commencement of the washing, flows from the bottom by turning a stop-cock, into the funnel placed below it. From this it can only flow off after it has filled it to the bend of a small siphon it contains, when the contents are discharged upon the edge of the filter, containing the material to be washed in another funnel. As soon as the lower obliquely cut end of the tube is closed by the liquid, the flow of water from the receptacle ceases, and only recommences after the liquid in the filter has run off so as to expose the end of the tube. The latter has a small bulb blown upon it, to prevent any minute portions of solid matter in the filter from being carried farther up into the tube.—Zeitschr. f. anal. Chem., 1880, p. 473, in New Rem., January, 1881, p. 12.

SOLUTION, PERCOLATION, FILTRATION, ETC.

New Extraction Apparatus.—Dr. F. Gantler describes an improved extraction apparatus which is particularly applicable for the exhaustion of small quantities of substances of volatile liquids. Fig. 10 represents the extraction vessel itself, which is composed of an exterior tube *a*. and an interior tube *b* provided with two knobs of glass on the outside. When the vessel is charged, the appropriate filtering material, tow or cotton, is wrapped around *b* between the knobs, and the whole is covered with filtering-paper, after which the tube is pushed down into the neck of *a* to make a tight filtering-joint. The substance to be exhausted is now poured on the filtering medium—the tube *b* being kept exactly in the centre—and the surface levelled off. Finally, after the vessel *a* has been connected with the flask, the volatile menstruum is poured on top, and, if it percolates clear, the whole is placed into the water-bath. The volatile vapors ascending from *c* through *a* are partially condensed in the upper part of the extraction-vessels *a*, and partly in the condenser *d*, which is a permanent arrangement, whence they are returned in a liquid condition upon the substance. The form of apparatus shown in Figs. 11, 12 is intended for the purpose of conducting a number of extractions at the same time. A water-bath *a* is so constructed as to heat six flasks at the same time; above, each extraction vessel is joined, by means of a cork, to a tin tube, which passes first through a cooling vessel, *b*, and afterwards to a condenser *d*, which is fastened into its socket, so that both

Fig. 10.

Fig. 11.

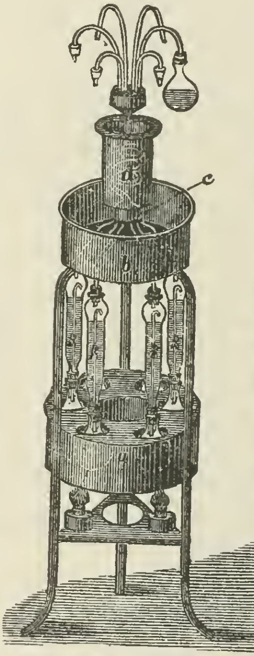
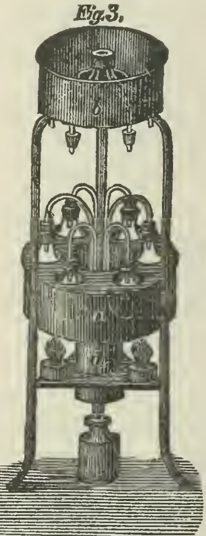


Fig. 12.

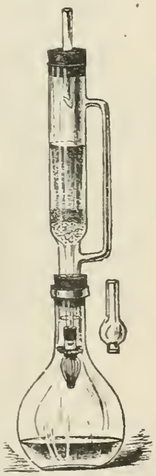


Gantter's Extraction Apparatus.

the cooling vessel *b* and the condenser *d* may be lifted off at one and the same time. The bottom of the socket *c* is so arranged that all the condensed ether is equally distributed over the six extractors. In the upper part of the condenser is fastened an expanded head, bearing six curved tin tubes, to which flasks may be attached. When the extraction is completed, the flasks are removed from the water-bath, fastened to the just mentioned corks, and after the condenser *d* has been unscrewed, the latter is lowered through the central opening in the water bath (see Fig. 12) until the flasks occupy their old place in the latter. Heating now the water surrounding the flasks the liquid distils over and is caught in the receiver on the bottom.—New Rem , October, 1880, p. 298.

Apparatus for Continuous Displacement.—During the exhaustion of very finely powdered substances in the usual forms of extraction-apparatus, in which the lower orifice is closed by a pellet of cotton or similar material, it happens not unfrequently that minute particles of the material are carried into the liquid, in consequence of which the latter has afterwards to be filtered, which operation is usually attended with some loss of substance. On the other hand, if the pellet of cotton is compressed too much, or if the powder to be exhausted has been pressed down too tight, the rate at which the liquid percolates will not correspond with that at which it is redistilled, so that either the percolator will run over or the heat will have to be withdrawn for a time. The introduction of small filters into the tube itself is not easy, and, even if accomplished successfully, it frequently happens that the powder, packed imperfectly, will not be thoroughly exhausted.

FIG. 13.

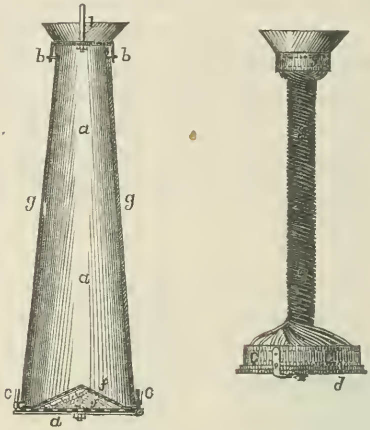


Weigelt's Displacement Apparatus.

Mr. C. Weigelt, of Rufach, proposes, therefore, to modify the Zulkowsky-Wolfbauer extraction apparatus by attaching to the outlet of the percolator, within the flask, a small filter. Upon the lower end of the inner percolator-tube a slit cork is pushed (slit in order to permit an equalization of the vapor-tension outside and inside of the filter), and upon this is fitted a small bulb attachment, upon which is fastened the small filter.—From Repert. d. Analyt. Chem., 1881, No. 1; in New Rem., June 1881, p. 171.

New Filter Press.—Gigot recommends the filter press illustrated by Fig. 14, which is operated by twisting. A slightly conical filtering-tube, made of strong cloth, is attached by its lower end to the perforated cone *d*, forming the bottom, and by its upper end is fastened to a funnel, which is so constructed that none of the material which has passed down into the filter can leak back. The lower ring *c*, which helps to hold the filter, is firmly secured, so that it cannot turn, and at the same time will cause the filter, when twisted, to retain a perpendicular position. The upper end is caused to be twisted by suitable belting, when the filter will finally assume the shape shown on the right. As soon as all the liquid is pressed out, the dry material is discharged by untwisting the filter and releasing the bottom, which opens downwards on a hinge.—New Rem., May, 1881, p. 144.

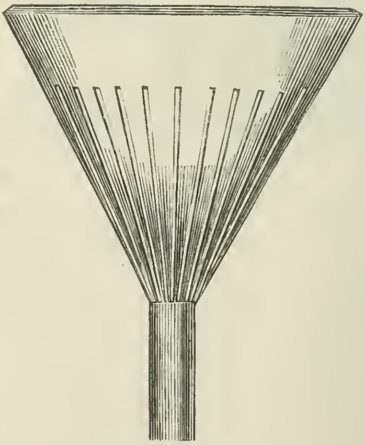
FIG. 14.



Gigot's Filter.

Funnels—Improvement for Securing Rapid Filtration.—Dr. Geissler draws attention to an improvement which consists in producing a series of small depressions or canals on the inner surface of glass funnels, reaching not quite to the upper edge of the same, as shown

FIG. 15.

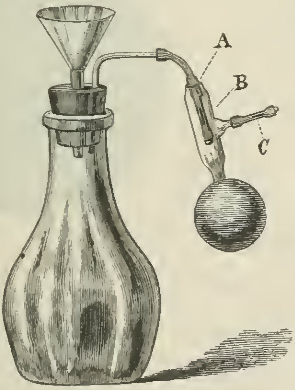


Funnel for Filtration.

in the drawing (Fig. 15). This may be readily done by the aid of hydrofluoric acid, or with fluoride of ammonium and sulphuric acid. The funnel is dipped into melted paraffin, wax or tallow; the pattern is then scratched off by means of a knife or needle, the neck is closed by means of a caoutchouc stopper, and the funnel filled with hydrofluoric acid. In from one-quarter to one-half hour the acid may be removed. Funnels constructed in this manner have many advantages over those with plain or ribbed surfaces. The paper may be made to adhere smoothly to the sides, and at the same time the liquid will find ready exit through the little channels. If the paper extends above the little channels, considerable suction is produced in them, and the rapidity of filtration is increased; and this is very much promoted if the neck of the funnel is extended by means of a long (0.5 m.) glass tube. To insure this, however, the filter must be fitted very snugly to the sides of the funnel.—Phar. Centralh., July 1, 1880, p. 231.

Apparatus for Filtration under Atmospheric Pressure.—Mr. D. Anson Parbridge has devised a simple apparatus which, when adapted to a pint flask, will, with a few compressions of the ball, afford a pressure equivalent to a column of water 8 to 10 feet high. The apparatus is shown in Fig. 16. *A*, *B*, *C* is a glass tube three inches in length and about three-eighths of an inch internal diameter. At *A* the tube is drawn tapering, to make it fit closely to a rubber tube three-sixteenths of an inch calibre, which passes inside of the glass tube. A short piece of glass tube is inserted into the rubber tube at *A* to make a tight joint; the lower end of this rubber tube is closed by inserting a short piece of glass rod. At *B* a mouth slit is made in the rubber tube three-eighths of an inch long (as recommended by Bunsen) to act as a valve. On the projecting short limb of the glass tube is a

FIG. 16.

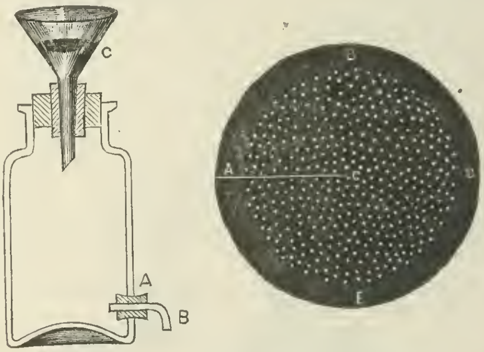


Apparatus for Filtration.

piece of rubber tube one-eighth of an inch calibre and about one inch long; the outer end of this tube is closed by a piece of glass rod. At *C*, a slit is made in the tube to serve as a valve. The lower end of the tube is drawn out to adapt it to a rubber ball of about two inches diameter.—Am. Jour. Pharm., July, 1880, p. 340.

Apparatus for Rapid Filtration.—Prof. V. F. Davenport recommends an apparatus, illustrated by Fig. 17, for the rapid washing of precipitates, etc. By means of the sharp corner of a file, wet with a saturated solution of camphor in oil of turpentine, a hole is bored in the side of a common packing bottle of a pint or more capacity, as shown at A. The hole is enlarged with a round file to about the size of the little finger, and a piece of thick-walled rubber tube bearing a bent glass tube is inserted in this hole. This makes a water-tight elastic joint, to which a piece of rubber tubing about 6 feet long is attached. The funnel is fitted to the bottle air-tight in the manner shown, and the latter being filled with water, this is allowed to run off into a receptacle below, making a very simple and inexpensive aspirator. To prevent the bursting of the filtering paper by the pressure, it is supported by a tin-foil cone, several of which can be made as follows: Upon several thicknesses of tin-foil is laid a card having drawn upon it a circle two inches in diameter, like Fig. 18. The circumference central point, and several lines of radial dots are then pricked through the card and the foil beneath. The circle thus pricked out is then cut with the scissors, the several thicknesses altogether. The radius A C is then cut through them. Each of the circles of foil can then be formed into a cone by bending the foil carefully round at the central point, C, till the point A is just over its opposite point, D. The other half is then carefully folded round outside of this, etc., etc.—New Rem., April, 1881, p. 108.

FIG. 17. FIG. 18.



Apparatus for Rapid Filtration.

Universal Quick Filter.—L. A. Endliger, of Worms, Germany, has constructed a new filtering apparatus which is very strongly indorsed by a number of prominent manufacturers. In this press, filtering paper may be used in full-sized sheets without being liable to be torn by the pressure exerted by the fluid during filtration.

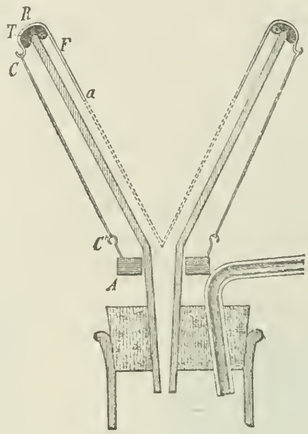
The whole press may be moved about on rollers. Upon the bed-plate are piled the filtering-frames, which are about 5 millimeters in thickness and alternate with layers of filtering-paper. The liquid to be filtered enters by a large stop-cock, situated at the bottom, into a vertical channel, formed by the round openings of the filtering-frames, in the following manner. Supposing we remove any three contiguous filtering-frames with paper, and number the frames respectively 1, 2, 3, and the sheets of paper *a*, *b*, *c*, it will be noticed that the filtering-frames 1 and 3, and consequently all those having *odd* numbers, differ in construction from the frame 2, or those of even numbers. Each frame also has two circular holes, which, when arranged one on top of the other, form two circular channels. Now the holes (on the right hand) in the *even* frames, 2, 4, etc., receive the muddy liquid to be filtered, which passes through small openings in the inner margin into the interior of the filtering-frame. The latter being covered with paper on both sides, the clear liquid is forced through both ways and collects in the channel formed by the apertures on the left. Hence the vertical channel on the right hand is always filled with turbid liquid, and the channel on the left hand with clear filtrate, which may be drawn off by means of the large stop-cock at the top.

This form of press is in use in chemical factories, color-works, distilleries, breweries, wine-depots, oil-mills, and various other establishments where large amounts of liquid are to be filtered with the least loss of time.

According to the nature of the liquid to be filtered, the filtering medium may be varied, so that either felt or flannel or filtering-paper may be used. It is important to use a medium of such a texture as will just barely retain the solid impurities and permit the clear liquid to pass. Of course, the nature of the liquid to be filtered exercises a good deal of influence on the ease and rapidity of filtration. Mucilaginous liquids filter more slowly than saccharine liquids, even if both are of the same specific gravity; those which are very muddy and concentrated filter more slowly than brighter and less concentrated liquids; alcoholic solutions and oils filter more slowly than aqueous solutions, and cold liquids more slowly than hot.—New Rem., July, 1880, p. 200.

Rapid Filter.—Mr. Jean de Mollin proposes an arrangement, illustrated by the accompanying cut, for rapid filtration, which has the advantage that the filtering surface is much larger than is usually the case. F is a funnel, made of tinned iron, which is perforated with small holes from the point up to the height *a*. Its upper margin is curved over and provided with twelve hooks, *C*. The funnel is put upon a glass funnel, over the edge of which a piece of rubber tubing is placed. The glass funnel having been introduced into the flask through the ring *A*, the tin funnel is tightly pressed upon the rubber packing by means of cords tied between the hooks *C*, and six similar hooks attached to the ring *A*. The filter is now put in the funnel, and the flask connected with the vacuum-pump.—New Rem., December, 1880, p. 355; from Zeitschr. f. Anal. Chem., 1880, p. 344.

FIG. 19.



Mollin's Rapid Filter.

Filtering Apparatus for Viscid Liquids.—Mr. J. Vincent Elsden suggests an apparatus of the shape illustrated in the accompanying cut, for the purpose of filtering viscid liquids. He especially designed it for filtering photographic emulsions, but it is applicable also to other thick liquids. The flat basin contains hot water, to keep the liquid to be filtered more fluid. A wide glass tube is bent in the shape of an S,

FIG. 20.

Filtering Apparatus for Viscid Liquids.

and upon one of its extremities a cuplike expansion is blown, or it is correspondingly widened. A small piece of sponge having been placed into the neck of the cup, the liquid slowly percolates through it and gradually fills the bend, from which it finally flows into the receiving vessel.—From the Brit. Jour. Photogr. Alm., 1881; in New Rem., May, 1881, p. 143.

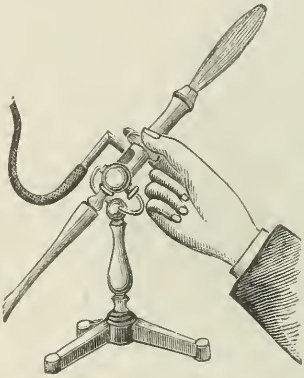
A Simple Aspirator.—One of the most simple forms of aspirators, for facilitating rapid filtration, or, in general, for the production of a rarefied space, is the contrivance which has been devised by Friedrich Lux. It may either be constructed from a piece of wide glass tubing, by means of two corks and four smaller glass tubes, or it may be entirely constructed of glass. One of the tubes introduces water; another, to which a rubber tube is attached, carries it off; the third tube is connected with the vessel from which air is to be aspirated; and the fourth tube may either be used for the same purpose, or it may be connected with a manometer, or it may be closed with a stopper. It makes no difference which tube is selected for introducing the water; but if the air is to be aspirated by one of the lower tubes, the vessel to be exhausted must stand at a higher level than the aspirator itself. In all cases the escaping water carries with it a copious volume of air, and produces a more or less rarefied space, depending on the length of the exit tube. The latter should have a bore of 5 mm. ($\frac{1}{5}$ inch) and a length of at least 1 meter (39 inches), and should be provided, near its attachment to the apparatus, with a screw pinch-cock, the proper regulation of which essentially facilitates the use of the aspirator.—From Zeitsch. d. Anal. Chem., 1880, p. 455; in New Rem., April, 1881, p. 112.

Material for Filtration and Decolorization.—G. C. Pfandler recommends the following: Three parts of dried or baked granulated clay are mixed with four parts of blood; sometimes a proportion of charcoal is added. The mixture is moulded into lumps of convenient form, dried, broken into small pieces, mixed with an equal bulk of granulated clay, and then carbonized in a retort.—Am. Jour. Phar., May, 1881, p. 251; from Scientific Am., February 5, 1881.

APPLICATION OF HEAT, VAPORIZATION, ETC.

A New Blast-lamp.—For the purpose of regulating the proper supply of gas and air in blast-lamps, it has been hitherto customary to provide them with stopcocks. But the necessity of interrupting the work whenever it is desired to alter the size or character of the flame, by turning one or another stopcock with the hand, is in many instances a great inconvenience. To remove this difficulty, Mr. Julius Schober has constructed a new kind of blast-lamp, in which the supply of gas and air is regulated by a rotary pinion, which may be easily turned by two fingers. This arrangement permits the operator to adjust the flame at any moment, without being compelled to remove his hands from the work or to interrupt the necessary turning of the object in the flame. The blast-tube is revolvable around two centres in a vertical direction, and is firmly retained in any position. The access of air takes place from the posterior, that of gas from the lateral tube. The nozzle end of the blast-tube may be slid forward or backward, so as to avoid the occurrence of a luminous or smoky flame.

Fig. 21.



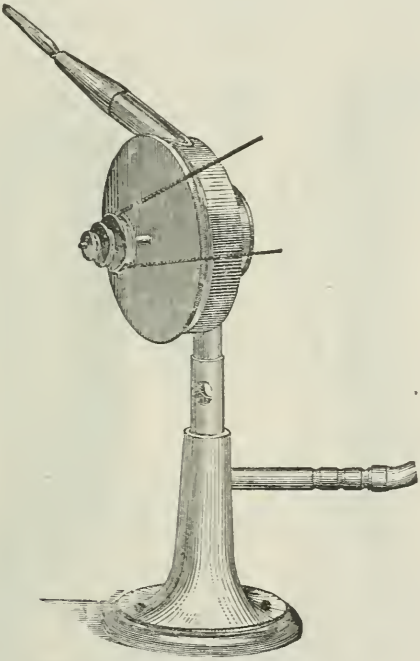
Schober's Blast-lamp.

To generate the requisite blast of air, Mr. Schober recommends, in place of the cumbersome blowpipe table or the inconvenient box-bellows, a strong air-reservoir of black devulcanized rubber, which may be compressed either by the hand or the foot or by holding under the arm.—From Zeitschr. f. Anal. Chem., 1880, p. 170; in New Rem., July, 1880, p. 205.

A New Gas Blast-lamp and Blowpipe.—Mr. T. T. Morrel is the inventor and patentee of the gas blast-lamp and blowpipe, illustrated by Fig. 22. The principal feature of this is a centrifugal fan about three inches in diameter, into the box or casing of which mixed air and gas pass from an arrangement precisely like a Bunsen burner. By the revolution of the fan, the air and gas are most perfectly mixed and projected through a nozzle of any desired form or size, producing a blowpipe flame of remarkable steadiness and intensity. The casing of the fan turns freely upon its axis, so that the flame may be used at any angle. The supply of air is regulated by a ring on the tube at the base of the lamp. By varying the amount of gas and air, the flame may be changed from a reducing one to an oxidizing, or *vice versa*, at will.

The range of temperature which can be produced by the flame of this blast-lamp is very wide, as an intense heat sufficient to melt a fine platinum wire, and higher than can be obtained from any other gas blast, can be easily reached, or it may be reduced to about the heat of an ordinary Bunsen burner. For ignition or fusion in crucible, the flame is very much superior to that of the usually used Bunsen's blast-lamp, on account of its solidity, the air and gas being thoroughly mixed before ignition. The same quality renders it superior for blow-pipe work, giving an atmosphere rather than a point of oxidation or reduction. The flame may be driven through an opening not larger than a pin hole, making a jet perfectly suited to jewellers' work and soldering.

FIG. 22.

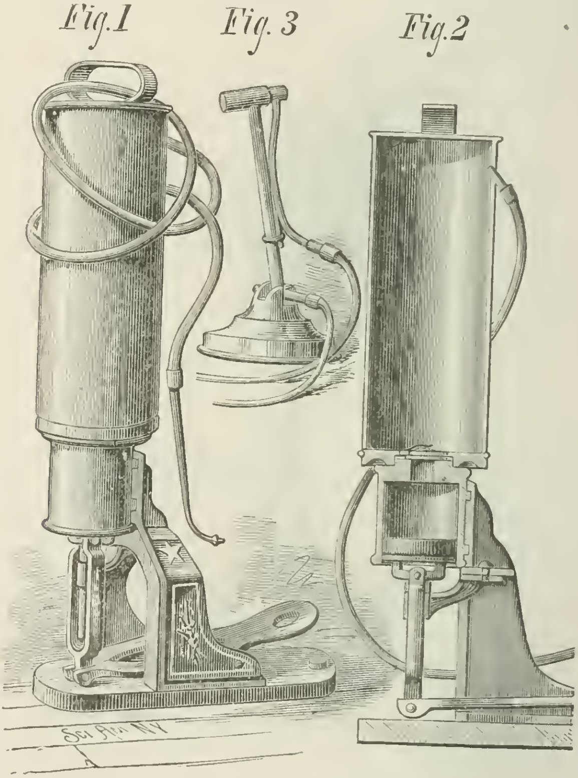


Morrel's Gas Blast-lamp and Blowpipe.

The power required to operate this blast-lamp is extremely small, there being scarcely any friction either of the running parts or of the gases themselves.—New Rem., April, 1881, p. 101.

Portable Mechanical Blow-pipe.—At a recent pharmaceutical meeting of the Philadelphia College of Pharmacy, Mr. J. Elliot Shaw exhibited and explained a portable mechanical blow-pipe, the invention of Mr. Burgess, which is illustrated by the accompanying cuts, Fig. 23 showing the general appearance, Fig. 25 the internal construction, while Fig. 24 represents a compound bench blow-pipe, which possesses a rocking motion, enabling the flame to be used in any position. The pump cylinder is mounted on an arched stand and contains a piston having a valve opening upwards. The piston is connected to the foot-pedal by a forked connecting-rod, and is moved by a slight and easy motion of the foot. The upper end of the pump cylinder is closed, with the exception of a valve aperture, which is covered by a valve opening upward into a cylindrical opening. Near the top of the air-reservoir there is a nipple to which is attached a flexible tube communicating to the blow-pipe, the outlet of which is much smaller than in the mouth of the blow-pipe, to permit of maintaining a pressure, which may be increased or diminished by a quick or slow motion of the treadle. For light and delicate work, when a gentle flame is required, a pressure of one or two pounds is given, but for brazing, annealing, fusing, etc., when a large flame is necessary, a few rapid strokes of the plunger will raise the pressure in the receiver to from ten to twenty

Fig. 23. Fig. 24. Fig. 25.

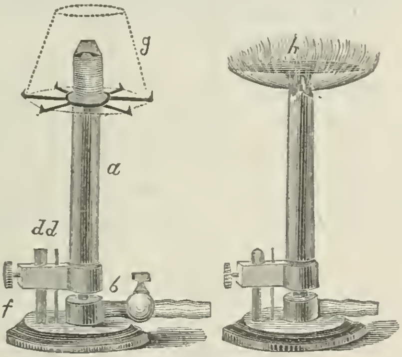


Burgess's Portable Mechanical Blow-pipe.

pounds, which can be sustained with but little exertion. The blowpipe may be used effectively with gas, alcohol, or oil flame; also for creating a draft in the use of charcoal or coke in connection with the small smelting furnaces now so largely in use.—Am. Jour. Phar., December, 1880, p. 633.

New Gas-burner.—Professor Terquem, of Lille, has devised a new form of laboratory gas-burner (Figs. 26 and 27), which differs from that introduced by Bunsen in several features. In the first place, the air is not admitted at the side, but from below, whereby a more intimate mixture of air and gas, and hence a more uniform flame and a higher temperature is obtained. The upper orifice of the burner is provided with two metallic strips crossing each other, producing four triangular openings for the escape of the gas and air. The gas enters through the nipple *b*, and ascends through the tube *a*. The latter may be raised or lowered at will by means of the guides at *d* and the set-screw *f*. The character of the flame may be altered in various ways. If it is desired to avoid the contact of the flame with the bottom of a flask, etc., it may be spread out by slipping over the tube an attachment ending in a disc of copper, producing a flame like that shown in Fig. 27. The temperature which may be obtained by means of this is so high that a copper wire of 1.5 mm. diameter may be melted in any part of it. These burners are manufactured, according to the inventor's designs, by Dr. Stohrer & Sohn, Leipzig.—From Chemiker-Zeit., No. 10, in New Rem., May, 1881, p. 143.

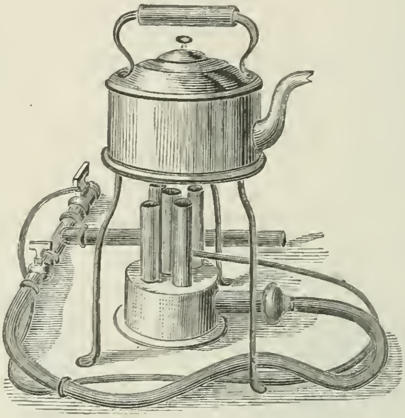
FIG. 26. FIG. 27.



Terquem's Gas-burner.

Rapid Boiler.—The accompanying cut illustrates an arrangement by which boiling water may, at any time, be got ready in a few seconds, for making infusions or other purposes. The general gas-tube supplies two branches, which can be used separately or together, as required. The small tube supplies the middle Bunsen's burner only, and gives but a small jet, consuming only a trifling amount of gas. By keeping this always burning, the water above is always kept hot. Whenever it is required at boiling temperature, the other tap is turned on, the other burners light themselves from the central jet, and the water boils almost immediately. This apparatus was devised by Dr. Symes and was exhibited at the British Pharm. Conference.—New Rem., December, 1880, p. 364.

FIG. 28.



Symes's Rapid Boiler.

Boiling-Point—Simple Method of Determination.—The determination of boiling-points in chemical investigations is of great importance, but the methods heretofore employed are not free from defects, inasmuch as they either yield inaccurate results or else consume and waste

FIG. 29.

Pawlewski's Apparatus.

more or less of the substance to be examined. Mr. B. Pawlewski, therefore, recommends the process here described as being free from all these defects. (See Fig. 29.)

The flask *K K*, of the capacity of 100 c.c., is half filled with glycerin, or sulphuric acid, or aniline, or paraffin. Its neck is closed by a tight-fitting stopper, having a small lateral notch (to allow the escape of expanded air), and a central hole through which is passed a long, thin-walled tube *E*, the lower end of which dips into the glycerin, etc. Near the mouth of this tube is a minute lateral opening, *O*. The tube itself is closed with a cork bearing a thermometer reaching to near its bottom. When using the apparatus, a few drops (0.5 to 1.5 cubic centimeters) of the liquid to be examined are introduced into the tube *E*, and the stopper with thermometer having been inserted, the flask is rapidly heated. The mercury will rise in the thermometer and there will be a period when it will remain stationary for several minutes. This is the boiling-point looked for. The mercury remains at this point as long as there are traces of the liquid in the tube, although the temperature of the surrounding glycerin is much higher than the boiling-point of the examined liquid.—From Berichte d. Deutsch. Chem. G., 1881, p. 88, in New Rem., June, 1881, p. 171.

Stills and Condensers—Cleansing Method.—Mr. P. Carles recommends as the very best method to deprive stills and condensers of the adhering resinous, oily, waxy, or tarry deposits, and of the accompanying odor left there by the last distillation, to use carbonate of ammonium. Supposing a still has been used for the preparation of an aromatic water. Scouring with acids or alkalies, sand, sawdust, etc., and the passage of steam, will make it apparently quite clean ; but if a piece of carbonate of ammonium is placed in the entrance of such a condenser, and steam passed, a surprising quantity of impurities will still be eliminated.—From Répert. de Pharm., p. 211, in New Rem., August, 1880, p. 244.

Drying-Cupboard.—A handy drying-cupboard, primarily intended for photographers, but also useful for other purposes, is described by A. Cowan. The box, of sheet iron, may be of any form most convenient, but the more shallow it is the better. A very good proportion is 30 inches high, 30 inches wide, and 10 inches deep from back to front. The front is closed up at the lower part about 6 inches, and a sliding door running in grooves closes the upper part, all but about half an inch at the top, a balance weight over a pulley supporting it in any position desired. This is much preferable to a door on hinges. The current of warm air enters at the bottom through a 3-inch circular opening, the iron stove-pipe arrangement being screwed on underneath. Above the opening, at a little distance, is supported a thin shelf of wood, about 1 inch smaller all round than the inside of the box, which acts as a diffuser, and stops the current of hot air from rushing up to one spot. Above this, at any convenient height, two bars are fixed to carry the feet of the drying-rack.—From The Brit. Journ. Photogr. Alm., 1881, in New Rem., May, 1881, p. 140.

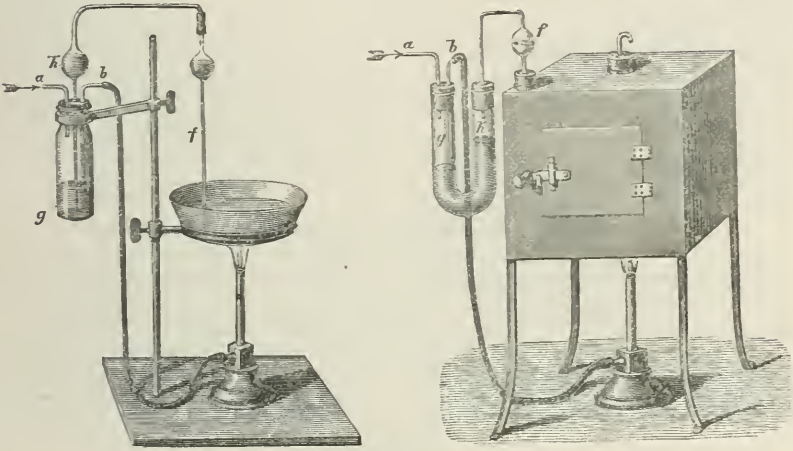
Steam Drying Apparatus with Continuous Draft of Warm Air.—The object of this apparatus is to warm at the same time two cylindrical drying compartments, and to generate a continuous draft of warm air in the pipes surrounding the drying-cylinders, as well as in the latter themselves.

A square box, which is hard-soldered, contains two cylindrical compartments, into each of which a movable set of drying-shelves, held together by a frame, fits, and each of which may be covered air-tight by a ground lid. The two cylinders are surrounded by a coil of lead-pipe, which enters the box at the bottom, being provided with a faucet on the outside, and after winding several times around the cylinders, opens into the upper part of the left-hand cylinder, where it discharges the air heated in its passage through the tube. From the left cylinder the heated air passes through a communicating pipe at the bottom into the right cylinder, and finally passes out at the top. The current of air is, however, greatly hastened by the ingenious attachment of a steam-injector, delivering a jet of steam into the outlet pipe, which jet pulls along with it a rapid current of heated air. Upon the upper surface of the box is attached a funnel-faucet for replenishing the water, and an opening for the insertion of a thermometer. At the side is attached a water-gauge, and a faucet for letting off the water. The box rests on a square iron support. This apparatus is invented and manufactured by Dr. Robert Muencke, Berlin.—From Phar. Centralh., 1880, New Rem., March, 1881, p. 79.

Apparatus for Preventing Evaporation Beyond a Certain Limit.—An apparatus which was proposed some years ago by E. Geyer, to prevent the evaporation of liquids beyond a certain limit, has lately been modified and improved by Max Süss, and described in the "Zeitschrift f. Analytische Chemie" (1880, p. 312).

The accompanying illustration requires but little explanation. To set the apparatus in action, the tube *b* is closed by pinching, some of the water in *g* is made to rise into *K* by blowing in at *a*, and at the same time the tube *f* (empty) is dipped into the liquid in the capsule. On removing the pressure from *b*, some of the liquid in the capsule will rise in the tube *f*. The gas required for heating the capsule is made to pass through *a* and through *b* to the burner. As soon as the evaporation has proceeded far enough to disengage the obliquely-cut end of the tube *f*, some air will rise in the latter, cause the column of liquid contained in it to fall back, and at the same time cause the water contained in *K* to flow back into the flask, where it will so increase the contents of the latter that the exit tube for the gas *b* will be under water, and the flame therefore be extinguished.

FIG. 30.

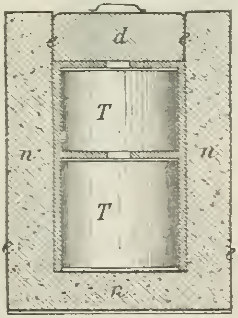


Apparatus for Limiting Evaporation.

The same principle may also be applied to drying-ovens, as is shown in the other cut. The arrangement is the same in principle and is set in action in the same manner.—New Rem., December, 1880, p. 363.

Apparatus for Preserving Liquids and Solids in a Hot Condition.—Mr. R. Meyn has improved the so-called "Norvegian Kitchen" as shown in the accompanying cut (Fig. 31). It may be useful in pharmaceutical operations, where protracted digestion is necessary, and is therefore described here.

FIG. 31.



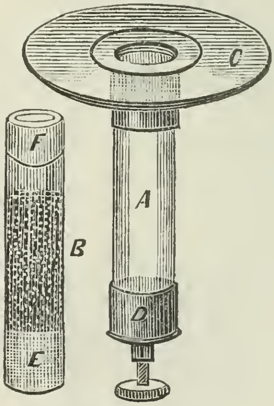
Apparatus for Maintaining Heat.

It simply consists of a cylindrical box of tinned iron or sheet tin, with double walls, *e e*, the interval being filled with any bad conductor of heat, *n*. When the apparatus is to be put to use, the material to be kept hot—say a meal—is heated to boiling for five or ten minutes, in the pots *T* and *T*, which are then set into the apparatus, covered with the double-walled lid *d*, and the whole is then set aside until it is wanted. If the meal had not been cooked before, it will be found that meat will be "done" in such an apparatus in about three hours, barley and rice in three to four hours; beans, lentils, and peas in about five hours; fresh vegetables in two to two and a half hours; and potatoes in one hour. Of course the materials may be left in the apparatus much longer, and the supper may be thus already prepared in the morning.—From Dingler's Polyt. Journ., pp. 237, 372; in New Rem., December, 1880, p. 335.

GENERAL LABORATORY OPERATIONS, ETC.

Microtome—Cheap Construction.—A. Schneider describes a cheaply constructed microtome, which answers the purpose of cutting thin microscopic sections perfectly. The method of construction is shown by Fig. 32. *A* and *B* are two glass tubes, *B* being selected so as to fit accurately into *A*. Upon *A* a perforated glass plate *C*, the perforation of which corresponds accurately to the bore of the tube, is fastened by the aid of a brass fitting; a brass fitting, or cap *D*, bearing a micrometer-screw, is attached to the opposite end of the same tube. The inner tube *B* is closed beneath by a small disk of glass, cemented on by means of silicate of sodium cement; it is then filled, as shown in the drawing, with small shot, which is kept in place by means of sealing-wax. The object to be cut, clamped in elder-pith, is introduced at *F*, *B* is introduced into *A* until it rests on the screw, a clean cut is then made, after which sections of any desired thickness may be cut by appropriately turning the screw. With a screw having 25 turns to the cm. a quarter turn will produce sections of 0.1 mm. thickness. For cutting, a razor, flat on one side and concave on the other,

FIG. 32.



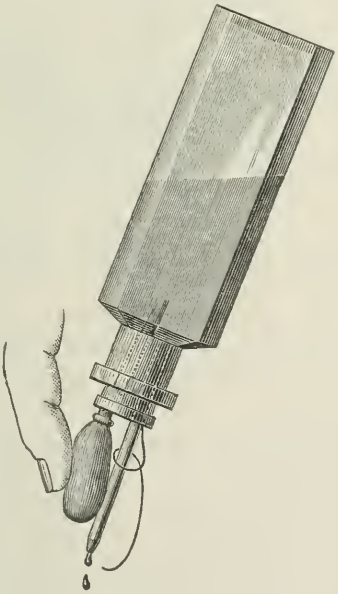
Microtome.

is the best instrument. To cut, it is firmly pressed upon the glass plate, and its entire length from the handle to the point is drawn through the elder pith bearing the object. The dimensions of the various parts of the little apparatus are given as follows: The tube *A*, length 7–9 cm.; internal diameter, 1.2–1.5; thickness of glass, 0.2 cm. The length of the inner tube is 6.5 to 8.5 cm. The diameter of the glass disk is 6–8 cm., and the thickness 0 2 to 0.3 cm.—Phar. Centralh., April 28th, 1881, p. 180.

Construction of Useful Apparatus by the aid of the Common Nipple.—Mr. Henry Biroth describes a number of useful apparatus for pharmacal and chemical manipulations, which are constructed by the aid of india-rubber nipples. The paper cannot conveniently be condensed, and must therefore be consulted in the original, which is accompanied by numerous illustrations.—Phar. and Chem., January, 1881; and Am. Jour. Phar., February, 1881, p. 62–64.

Drop Attachment for Bottles.—Mr. Raoul Bravais has invented the new drop arrangement for bottles, illustrated by Fig. 33. It consists of a tube inserted in a stopper and provided with a flexible air-bulb for blowing air into the bottle, and another tube inserted in the stopper through which the liquid escapes. By pressing upon the rubber bulb with more or less force the liquid is made to escape with more or less rapidity.—Am. Jour. Phar., April, 1881, p. 176.

FIG. 33.



Bravais's Drop Attachment to Bottles.

Wire Apparatus for Laboratory Use.—Mr. George M. Hopkins communicates to "Scientific American" a useful paper, in which he gives description for the construction of a number of handy articles for use in the laboratory. This paper, which is profusely illustrated, is reproduced in New Rem., January, 1881, p. 6–8.

Charcoal-Points for Cutting Glass.—The following formulas for preparing charcoal-points for cutting, or rather cracking, glass, are given in "Phar. Centralh.," October 21, 1880, p. 382, from "Erfind. u. Erfahr.," No. 11, p. 532:

1. 100 grams gum arabic are dissolved in 240 grams water; 20 grams storax in 60 grams alcohol; 20 grams benzoin in 30 grams alcohol of 0.83 sp. gr., and 40 grams gum tragacanth, are made into a homogeneous paste, with 640 grams of hot water. The mucilages of tragacanth and gum arabic are mixed; the alcoholic solution of the balsams are mixed and added with trituration to the mixture of the mucilages; finally, 240 to 280 grams of very *finest* powdered charcoal are thoroughly incorporated, and the resulting mass is rolled on a board, covered with finely powdered charcoal, into cylindrical pencils one centimeter in diameter. Each pencil is pointed before using it.

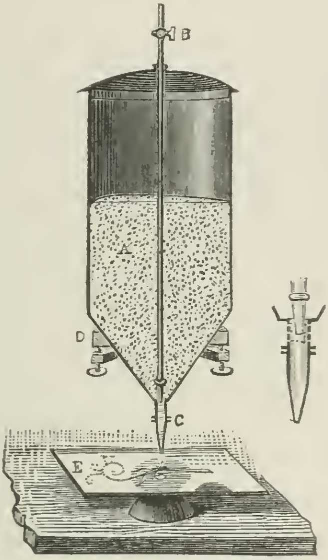
2. 8 to 10 parts of gum tragacanth are made into mucilage with 100 parts of hot water, 30 parts of acetate of lead are added, and then 60 parts of very finely powdered beechwood charcoal. Pencils are then made as above.

3. Cylindrical pieces of soft wood—poplar or willow—about the thickness of a finger, and well dried, are immersed in a concentrated solution of acetate of lead for one week, and then thoroughly dried. They also have the property of burning with intense heat and continuously.

For ordinary purposes Nos. 2 and 3 answer very well; but No. 1 is most suitable for breaking strong and heavy glass, burning slower and giving greater heat. It is necessary of course to start the cut with a sharp file or a diamond.

An Inexpensive Sand-Blast Apparatus for Engraving Labels, etc.—Well-dried sand (see Fig. 34), contained in the cylindrical vessel *A*, is allowed to flow in a continuous stream through the tube *C*, the length and inclination of which can be altered at will, so as to regulate the fall of the sand. A tube carrying a current of air or steam terminates just above this spout, in a nozzle containing a series of fine holes. The sand, urged on by the jet, is thrown violently against the glass plate *E*, or other body placed within its range, and thus exerts an abrading action. By varying the quantity of the sand, the volume and the velocity of the current, as well as the diameter of the jet, more or less rapid effects are produced. Holes may be drilled in glass, and in substances much harder than glass, by means of this apparatus. In engraving on glass, very little pressure is needed, the current from the bellows of an enameller's lamp being quite sufficient. In this way, the divisions on graduated tubes, the labels on bottles, etc., can be easily engraved in laboratories with but little trouble. The portions of the glass which are to remain clear are covered with paper, or with an elastic varnish, these substances being sufficient protection against the abrading action of the sand.—New Rem., April, 1881, p. 107.

FIG. 34.



Inexpensive Sand-blast.

Mixture for Writing on Glass.—Mr. F. L. Slocum has made an analysis of a preparation which, under the name of "Diamond Ink," is recommended for writing on glass with a common pen. It is a very useful article for labelling bottles, and proves to be a mixture of barium sulphate, ammonium fluoride, and sulphuric acid, contained in *glass* bottles, which are coated on the outside with asphaltum varnish and on the inside with wax. It may be made by mixing together three parts of barium sulphate and one part of ammonium fluoride, and adding to this sufficient sulphuric acid to decompose the latter. It may be kept in a bottle prepared as above, or, preferably, in a gutta-percha or leaden bottle.—Am. Jour. Phar., December, 1880, p. 600.

Mr. F. L. Slocum complements the above by the following notes: Liquid hydrofluoric acid etches glass, leaving a smooth surface; the fumes of the acid, however, act on glass, leaving a slightly rough surface. Fluoride of ammonium dissolved in water etches a still rougher surface on slight heating; but if this salt be mixed with an equal bulk of sulphate of barium, moistened with water and gently heated, a very rough opaque surface is produced.—Ibid., February, 1881, p. 61.

Labels for Shop Bottles, etc.—Mr. R. Triest recommends the following mode of labelling shop bottles, etc.: Ordinary capping-paper, preferably of a lemon-yellow color, is sponged over lightly and allowed to dry. The label is then written with ink that does not flow, for which the following is a good formula: 3 parts of extract of logwood and 1 part of bichromate of potassium are dissolved in 30 parts of water: the clear solution is decanted, and 2 parts of gum arabic dissolved in it. When the ink has dried, the label is pasted on the bottle (or other vessel) with a paste prepared by stirring a cold magma of wheat starch and water into a boiling solution of ordinary glue. When the label has become dry, it is twice coated with the same paste, allowing the first coat to dry before applying the second. When the last coat of paste is dry, the label is varnished with dammar varnish. This varnish may be made by dissolving sufficient gum dammar in oil of turpentine, by the aid of a water-bath, to make a syrupy solution, to which 10 per cent. of Canada balsam is added, and the whole clarified, either by subsidence or by filtration through cotton.—D. A. Apothek. Ztg., September 1, 1881, p. 4.

Label Varnish.—An excellent varnish, which dries in a few seconds, and produces a colorless, smooth, and shining coat, is prepared, according to R. Kirsten, from the following:

Sandarac,	53
Mastic,	20
Camphor,	1
Oil of lavender,	8
Venice turpentine,	4
Ether,	6
Alcohol,	40

The ingredients must be macerated for weeks, until everything is dissolved. It is therefore advisable to prepare a sufficient quantity, to last for some time, at once.—Pharm. Zeit., 1881, No. 13; New Rem., 1881, p. 157.

Aqueous Varnish and Starch Gloss—Improved Preparation.—Dr. Josef Maria Eder some time ago gave the following composition of a varnish, which was intended to be applied to sized or unsized paper, photographic prints, maps, etc., in order to give them a *glossy* surface without striking through:

Three hundred parts of water are boiled for fifteen to thirty minutes with 3 to 5 parts of cut marshmallow root. The liquid is then poured off, and, after the addition of 24 parts of borax, 4 parts of "anhydrous" soda, and 100 parts powdered bleached shellac, the whole is heated again. After a short time the shellac dissolves to a muddy yellowish liquid, which, after cooling, is filtered through cotton.

Dr. Geissler, one of the editors of the "Pharm. Centralh.," makes the following remarks: "Althæa root, which a pharmacist would probably *not* boil, is entirely superfluous in this varnish, and so is also the soda. I have, myself, made experiments to prepare such a varnish, and have found that it is most simply and rapidly prepared by shaking a saturated solution of borax with powdered shellac, *without* heat. One part of shellac is soluble in 2 parts of a saturated solution of borax, after frequent shaking during two or three days. In 3 parts, however, it is easily soluble. The *bleached shellac* must be preserved *under water*, and must be dissolved *immediately after being powdered;* for, if it is allowed to be exposed to the air in a powdered condition for several days, it will either not dissolve at all, or only with great difficulty. If a higher temperature than 50° or 60° C. is used in preparing the varnish, it is apt to assume a faint reddish color, the cause of which I have vainly tried to ascertain. The finished varnish, however, bears heat very well. Now this varnish may not only be used for rendering pictures, maps, prints, etc., *glossy*, but it is *a most excellent starch-gloss*, and its preparation would therefore be also remunerative for many pharmacists. In fact, this varnish is much more appropriate and serviceable for this purpose than all other known commercial 'starch-glosses.'"—New Rem., November, 1880, p. 325.

Bottling Wax—Preparation from a By-Product.—Mr. J. F. Brown recommends the balsam of tolu, which has been used for preparing the syrup (of the "Br. Phar."*), for the purpose of preparing bottle wax. By stirring into the melted balsam one-tenth its weight of levigated bole, a wax is obtained which sets quickly with a fine glossy surface, and is less brittle than that generally employed. A mixture of residual balsam, amber resin, of each 4 parts; Venice turpentine, vermilion, of each 1 part; melted together and well stirred, forms sealing wax of very fair quality.—Pharm. Jour. Trans., June 4, 1881, p. 1003.

Transparent Capping-Fluid for Bottles.—A very elegant substitute for metallic caps on bottles has recently come into use in France. It consists in dipping the necks of the bottles, suitably corked, and, if desirable, provided with a tag or label pasted over the cork, into a fluid prepared with the following ingredients: colophonium (resin), 20.0; ether, 40.0; collodion, 60.0 parts; coloring matter to suit. The liquid (varnish) dries rapidly and leaves a beautiful transparent coating.—Pharm. Centralh., November 4, 1880, p. 400.

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* The balsam is extracted by boiling with water.—REP.

India-Rubber Tubing—Preservation.—Mr. Mareck relates his experience of having met with serious annual losses, in consequence of certain kinds of india-rubber tubing soon becoming brittle on exposure. After many experiments, he has adopted the plan of preserving them under water, which he renews from time to time. He found that even the thickest kind of tubing will thus remain soft and pliable without losing elasticity; nor has he found any other drawback by adopting this plan, except this, that they undergo a change in appearance. Red or brown tubing gradually fades, and becomes brownish or grayish-yellow; gray tubing becomes darker and browner externally. A section of tubing reveals the fact that about one-half of the thickness of the rubber, from the outside towards the middle, appears bleached and fatty; but the change is one which is rather of benefit for their practical use. The author adds that very thin rubber bands with which other goods were tied became so soft that they could be rubbed to small crumbs with the fingers.—From Dingler's Polyt. Jour., 239, p. 325; in New Rem., May, 1881, p. 149.

Cement for Rubber.—The following is given in "Drug. Circ." (June, 1881, p. 87): Powdered shellac is softened in ten times its weight of strong water of ammonia, whereby a transparent mass is obtained, which becomes fluid, after keeping some little time, without the use of hot water. In three or four weeks the mixture is perfectly liquid, and when applied it will be found to soften the rubber. As soon as the ammonia evaporates the rubber hardens again, and thus becomes impervious to gases and liquids. For cementing sheet or rubber material in any shape to metal, glass, and other smooth surfaces, the cement is highly recommended.

Caoutchouc Cement for Rubber Goods.—Dissolve 10 parts of caoutchouc, in small pieces, in 280 parts of chloroform, by maceration. Melt 10 parts more of finely cut caoutchouc with 4 parts of resin, add 1 part of turpentine, and dissolve the whole in 40 parts of oil of turpentine. Then mix the two solutions. For use dip a piece of linen in the cement and apply it to the torn article of rubber, which should also receive a layer of the cement before and after the application of the linen.—New Rem., May, 1881, p. 158.

Cement for Aquaria.—Dr. Phin recommends: litharge, 3 p.; white sand, 3 p.; plaster of Paris, 3 p.; resin, 1 p.; boiled linseed oil, sufficient. The solids are to be taken by measure in powder and mixed. As it sets rapidly, the oil must not be added until it is wanted for use. It is all the better for being pounded in a mortar. It hardens in three days, holds firmly to glass, and with it glass tanks may be made without frames, if the angles are well filled with cement.—Drug. Circ., June, 1881, p. 87.

Cement for Paper.—Fr. Daun recommends to dissolve 180 gm. of best French glue in 180 gm. of water by soaking and heating; then to add a solution of 1 gm. of shellac in 6 gm. of alcohol, and stir well as long as the solution is warm. Mix also 35 gm. of dextrin in 50 gm. of alcohol and 25 gm. of water, stir well in a beaker and place it into warm water until the solution is completed and has acquired a clear brown color. Mix this solution with that of the glue and pour the whole into a suitable mould in which it may solidify. When wanted for use, cut off a small piece and liquefy it by warming.—New Rem., August, 1880, p. 243; from Neueste Erfind. und Erfahr.

Liquid Glue—New Formula.—The following is given in Drug. Circ. (June, 1881, p. 87): Common glue and whiskey are put together in a bottle, which is corked tight, and set by for two or three days, when it will be fit for use. In winter it should be set in warm water before using. Glue thus prepared will keep for years. A strong solution of isinglass made in the same way is an excellent cement for leather.

Freezing Mixture.—The chemical laboratory of H. Finzelberg (at Andernach) offers a freezing mixture having the following composition: Chloride of calcium, 20 p.; chloride of magnesium, 20 p.; chloride of sodium, 6 p.; chloride of potassium, 13 p.; water, 41 p. If this salt is mixed with an equal measure of snow at 0° C. (32° F.), the temperature will sink to —15° C. (= 5° F.). If the snow or broken ice is at —5° C. (= 23° F.), the degree of cold obtained will be —30° C., or 22° below zero Fahrenheit.—Drug. Circ., May, 1881, p. 69; from Industrie Blätter.

Hygroscopic Substances—Preservation in a Dry Condition.—Mr. R. Kirsten communicates a paper, in which he relates his experience with the use of lime as an agent to keep hygroscopic substances from attracting moisture. He says: "The use of lime for this purpose is not new, but it is not nearly as much employed as it deserves. I used it for about ten years with such success that I have constructed, during that time, five larger and smaller drying-boxes. Some of these serve for temporary driers, others for the permanent keeping of hygroscopic substances. In accordance with this object, some of them are placed in the dispensing department, others in the store-room, or in the garret. The largest has a height of about 28 inches, and is 40 inches square; the others are about 24 inches long, 20 inches high, and 20 wide. They are made of heavy wood, covered with a tight lid, and are lined with sheet zinc. Upon the bottom of each box, according to its size, are placed 15 to 100 kilos of burnt lime, and upon a false bottom, laid over this, the substances to be preserved, which are best kept in high narrow vessels, labelled on the cover (of course, they must be labelled so that no mistake can be made by a misplacement of a cover). All these vessels may be closed either with cork or glass stoppers, since it is a matter of common experience that there is hardly any kind of stopper which could alone be trusted to hermetically close a vessel.

"One filling is enough for nearly a year, since the lime, even after crumbling to pieces, still retains its absorbent power for a long time. It is evident that such drying-boxes are much cheaper than those which constantly require heat, not reckoning the additional advantage that they can be carried about and placed anywhere. And, as regards efficiency, they are far ahead of heated driers. Not only may substances which contain volatile ingredients be perfectly dried and kept so without loss, but even the drying itself is carried much further, and is much more perfect than in the others."

The author states that dry extracts may be preserved in these boxes in a pulverulent form for years, notwithstanding that they are frequently taken out for the purposes of dispensing. Effervescing powders may be kept ready mixed, and put in paper packages without ever becoming damp. If squill, saffron, cardamom, opium, vanilla, etc., are for some time kept in these boxes, they become so brittle that they may be readily powdered. All recently purchased drugs, which should be kept in a dry condition, may for some time be deposited in these boxes, to deprive them of all moisture. In the case of odoriferous substances, it is advisable to inclose them in tin-boxes, to prevent their odor from being communicated to the other contents.—From Pharm. Zeit., 1881, p. 13; in New Rem., May, 1881, p. 151.

Dried Salts.—Mr. R. F. Fairthorne draws attention to the convenience of dispensing various salts, containing much water of crystallization, in a dry, powdery condition. By keeping 400 grains of each of the following salts at a temperature below but near 120° F. for four or five days they ceased to lose weight, and were reduced as follows:

Sulphate of magnesium, to 355 grains = 89 per cent.
Sulphate of sodium, " 180 grains = 45 "
Phosphate of sodium, " 235 grains = 59 "
Sulphite of sodium, " 220 grains = 55 "

The undried salts are with difficulty reduced to powder.—Am. Jour. Ph., October, 1880, p. 489.

B. PREPARATIONS.

ACIDA.

Aromatic Sulphuric Acid—Extemporaneous Formula.—A somewhat lighter-colored preparation, but in other respects the equal of the officinal one, is obtained by Mr. R. F. Fairthorne by mixing 6 troy ounces of sulphuric acid with 1 pint of alcohol, allowing the mixture to cool, and then add a mixture of 9 drops of oil of cinnamon, 4 fluid ounces of tincture of ginger, and 12 fluid ounces of alcohol.—Am. Jour. Phar., July, 1880, p. 371.

AQUÆ.

Distilled Water—Snow-water a Substitute.—Mr. Labor, a pharmacist of Jaligny, has recorded that, by collecting, melting, and filtering pure snow, he has obtained a supply of "distilled" water perfectly insensible to all the tests for impurity, such as nitrate of silver, perchloride of mercury, soluble salts of baryta, alkaline carbonates, and oxalate of ammonia.—Chem. and Drug., April 15th, 1881, p. 167. Melted ice has been repeatedly recommended for the same purpose.

Distilled Waters of the Phar. Germ.—Mr. E. Dieterich observes that the concentrated distilled waters of the Phar. Germ. soon separate a portion of their volatile oil, and become in consequence weaker. If these waters, however, are subjected to a second distillation (rectification), they do not separate oil, though they are from the first more turbid than those obtained by the single distillation. When mixed with simple distilled water, in the proper proportion, they produce an aromatic water of unexceptionable quality.—Phar. Centralh., November 11th, 1880, p. 403.

Aqua Amygdalæ Amaræ.—Mr. G. A. Zwick has made some experiments which tend to show that peach kernels are with advantage substituted for bitter almonds in the preparation of bitter almond-water. The flavor of the water made with the peach kernels cannot be distinguished from that made with bitter almonds. The yield of water containing one per mille of hydrocyanic acid is larger from peach kernels than from bitter almonds, probably because the latter have more or less sweet almonds in admixture.—Am. Jour. Phar., May, 1881, p. 228.

Aqua Lauro-cerasi—Strength of Commercial Specimens.—Mr. J. Woodland has made twelve estimations of hydrocyanic acid in samples of cherry-laurel-water obtained from different pharmacists. In two samples he found no trace of hydrocyanic acid, and these he described as a mixture of essence of almonds (*sine* prussic acid) and water, the odor being very different from that of the other samples, and alcohol proved to be present. The other samples contained proportions of hydrocyanic acid from 0.024 to 0.052 per cent., the variations being due probably to age. The author had found that a recently distilled sample of cherry-laurel-water from fresh leaves contained 0.0524 per cent., one distilled from dried leaves 0.024 per cent. This showed that in the process of drying, the principles, which with water produce hydrocyanic acid, were partially destroyed.

As an easy test for the presence of hydrocyanic acid in cherry-laurel-water. Mr. Woodland recommends a weak solution of mercurous nitrate in diluted nitric acid, which in the presence of a cyanide gives a grayish-brown precipitate, even in the presence of chlorides, bromides, iodides, or phosphates. The test is not so delicate as the Prussian blue and sulphocyanide tests, but it is sufficiently so for the purpose to which it is applied; a sample of cherry-laurel-water not giving a reaction with the mercurous nitrate solution would certainly not owe its efficacy to hydrocyanic acid.—Chem. and Drug., September, 1880, p. 390; from Proc. Brit. Phar. Conf., 1880.

Cinnamon-water—Decomposition.—Mr. J. B. Enz had observed that a considerable amount of cinnamic acid had crystallized out on exposure from a water obtained by distillation from Chinese cinnamon. In order to obtain more of the acid, he added to this water ten drops each of oil of Ceylon cinnamon and of pure glycerin; but instead of cinnamic acid there appeared upon the surface of the water colorless, very refractive drops of a benzol-like odor. It seems, therefore, that under certain conditions the cinnamic acid of cinnamon-water may be decomposed in the same manner as by distillation with excess of lime with cinnamene and benzol. Whether this decomposition is due to the presence of protein compounds mechanically carried over in distillation, or to other causes, has not been ascertained.—Am. Jour. Phar., December, 1880, p. 601; from Arch. d. Phar. October, 1880, p. 287.

CERATA ET UNGUENTA.

Unguentum Hydrargyri—Preparation.—According to Professor J. P. Remington the following formula is very easy of execution: Mix 50 parts of mercury with 4 parts of compound tincture of benzoin, and gradually add 10 parts of mercurial ointment (which must be well prepared and need not be old or rancid). Triturate the mixture until the globules of mercury cease to be visible with a lens of 10 diameters power; then add 25 parts each of suet and lard, previously melted together and partially cooled, and mix until smooth.—Am. Jour. Ph., April, 1881, p. 192.

Mercurial Ointment—New Method of Extinguishing the Mercury.—A writer in the "Archivio di Farmacia" (1881, p, 36), proposes the following process: Mix intimately 1 part of pure diastase with 500 parts of lard, at a temperature between 20° and 25° C. (68° to 77° F.); to the mixture add 500 parts of metallic mercury, and, on trituration, the latter will be extinguished in a few minutes. Another quantity of 500 parts of mercury is then added, and, when this is extinguished, the remainder of the lard or suet is incorporated, so as to produce 2000 parts of product. The latter is thus obtained without trouble, and invariably of a perfect condition.—New Rem., May, 1881, p. 140.

Ointment of Oxide of Zinc—Preparation.—Mr. R. F. Fairthorne finds that a very smooth ointment can be made from the ingredients composing the officinal oxide of zinc ointment, if the oxide is first triturated and mixed with glycerin in a mortar until smooth, and then incorporated with the lard. During warm weather (75° to 95° F.). the ointment is too soft. The addition of 40 grains of white wax per ounce is therefore recommended.—Am. Jour. Phar., November, 1880, p. 540.

Unguentum Acidi Borici (*Lister Salve*).—The formula: Boric acid, white wax, each 1.0; paraffin, 2.0; expressed oil of almonds, 6.0;—yields a salve which, particularly in cold weather, is brittle like wax. A formula proposed as a substitute directs boric acid, 2.0, to be dissolved in warm glycerin, 6.0., and this solution to be incorporated with a mixture of paraffin and soft paraffin, 12.0; but this does not yield a uniform ointment. Krapfenbauer now recommends the following formula: Melt paraffin, 9.0; add oil of almond, 13.0; when cold mix by trituration with finely-powdered boric acid, 6.0, and soft paraffin, 8.0. The consistence is unobjectionable, and the ingredients do not separate on keeping the salve for years.—Am. Jour. Phar., May, 1881, p. 247, from Phar. Ztg., 1881, p. 184.

Hebra's Diachylon Ointment—Improved Process.—A. Deringer, in Zarskoe-Szelo proposes to prepare this, not from the officinal emplastrum plumbi, but from oleate and margarate (*sic*) of lead, obtained by precipitating a solution of soap with acetate of lead.

Dissolve 200 gm. of acetate of lead in 1 liter of distilled water, and 300 gm. of white Castile soap in 1½ liter of warm distilled water. Filter both solutions and mix them. The precipitate is washed with water, then freed from moisture as much as possible by kneading and 1 part of it is melted together with 1½ parts of best olive oil on the water-bath. The mixture is afterwards triturated in a mortar until it forms a fine, white salve. In this condition it partakes of all the advantages of Hebra's ointment.—From Phar. Zeitsch. f. Russl. and Phar. Centralh, in New Rem., July, 1880, p. 220.

Pomatum Rusci.—Professor J. M. Maisch states that this preparation, often sold in New York as *Hebra's Tar Pomade*, is prepared by mixing one part of birch tar (which see), with three or four parts of soft paraffin.—Am. Jour. Phar., February, 1881, p. 56.

Cold Cream—Improved Formula.—A correspondent of the "Chemist and Druggist," offers the following: Put 9 drachms of white wax, 9 drachms of spermaceti, 7 ounces of water, 6 ounces of expressed oil of almonds, and 1 ounce of precipitated chalk, into an earthenware vessel, melt by the heat of a water-bath, add 6 ounces more of oil of almonds, and stir until cold. The more stirring the better. When cold add 12 drops of chloroform, and otto of rose *ad libitum.*—Drug. Circ., March, 1881, 35.

Cold Cream.—The following formula is said to replace a highly esteemed French article of "cold cream" of unknown composition: Quince mucilage, 40 p.; almond soap, 1 p.; stearic acid, 10 p.; glycerin, 2 p. It is stated that this preparation is not liable to become rancid.—Chem. and Drug., April, 1881, p. 153.

Lip Salve—New Formula.—The following formula is recommended by Mr. Bienert, of Orechow, Russia. He states that the use of yellow instead of white wax prevents rancidity for nearly a year, and that the addition of salicylic acid insures its keeping qualities for a much longer period:

Spermaceti,	18 parts.
Yellow wax,	100 "
Oil of almond (or olive),	150 "
Alkanet,	12 "
Oil of bergamot,	2 "
Oil of lemon,	2 "
Pomade jasmine,	4 "
Salicylic acid,	3 "

Instead of alkanet root, ¾ to 1 part of alkannin may be used.—From Phar. Zeitsch. f. Russl., No. 23, in New Rem., March, 1881, p. 85.

Cosmetic Pomade.—The following formula is given in New Rem., November, 1880, p. 349:

White wax,	4½ oz. avoird.
Lard,	4¾ oz. "
Balsam of Peru,	60 grains.
Oil of orange flowers,	30 drops.
Oil of lavender,	5 "
Oil of cloves,	6 "
Oil of rosemary,	5 "

Melt the lard, wax, and balsam, and stir them constantly until they thicken, when the oils are added. This is then poured into moulds; when cold, wrap up each stick in wax-paper and tinfoil.

COLLODIUM.

Styptic Colloid—Improved Formula.—The following is given in Drug. Circ. (May, 1881, p. 65), the ingredients being mixed in the order in which they are named: Collodion, 100 p.; carbolic acid, 10 p.; tannin, 5 p.; benzoic acid (from benzoin), 5 p. The finished preparation has a brown color, and leaves, on evaporation, a strongly adherent pellicle. It instantly coagulates blood, forming a consistent clot, and a wound rapidly cicatrizes under its protection.

ELIXIRS.

Simple Elixir—Improved Process.—Mr. J. B. Moore states that the formula reported to the Am. Phar. Assoc. (Proceedings, 1873) does not form a clear mixture, and there are several other objectionable features about it which he has endeavored to correct. As the result of his experiments he recommends the following improved process for its preparation: Dissolve 40 troy ounces of granulated sugar in 70 fluid ounces of water, heated to 200°, in a suitable bottle; add to the solution two pints of deodorized alcohol, and mix well. Rub 45 minims of oil of cinnamon (true) and 2 fluid drachms of fresh and prime oil of orange, with 6 drachms of carbonate of magnesium, for at least ten minutes; then triturate thoroughly with two pints of the hot menstruum very gradually added; transfer to the bottle containing the remainder of the menstruum, and shake the whole vigorously for several minutes. Set aside, occasionally shaking, until cool; then filter, and pass sufficient of the mixture of one part (volume ?) of deodorized alcohol and three parts (volume ?) of water through the filter to make the filtrate measure eight pints.—Drug. Cir., January, 1881, p. 2.

Elixir of Valerianate of Ammonia—Improved Formula.—Mr. R. F. Fairthorne recommends the following formula for an agreeable elixir of valerianate of ammonia: ℞. Ammoniæ valerianatis, ʒiij, gr. xij; syrupi, f℥iij; alcoholis, f℥j × ʒvj; ext. aurantii cort. recentis (? Rep.), fʒj; liq. ammoniæ, q. s.; p. cocci, ʒj; aquæ, q. s. ut fiat f℥xij. The valerianate is to be dissolved in 3 fluid ounces of water, the solution neutralized *accurately* with the ammonia solution, and the elixir then finished *sec. art.*—Am. Jour. Phar., August, 1880, p. 407.

Elixir Glycyrrhizini.—Mr. R. F. Fairthorne recommends the following formula for elixir of glycyrrhizin, which will effectually disguise the bitterness of quinia. Impure glycyrrhizin is first made as follows: Mix 1 fluid ounce of glycerin, 2 fluid drachms solution of ammonia, and half pint of diluted alcohol. With two fluid ounces of this mixture, moisten 8 troy ounces of liquorice root, in moderately fine powder, pack into a percolator, and pour on the remainder. Displace with diluted alcohol until 8 fluid ounces of tincture are obtained; to which add nitric acid as long as a precipitate occurs; set aside in a cool place for five or six hours; then pour off the supernatant liquor (which reject), and drain the precipitate in a filter. Dissolve the impure glycyrrhizin, so obtained, in 2 fluid ounces of water by the aid of ammonia, carefully avoiding excess; filter the solution, and add it to the following mixture: Glycerin, f℥ij; syrup, f℥iij; Curaçao cordial, f℥iv; water, sufficient to make the elixir measure f℥xij. Filter. —Am. Jour. Phar., May, 1881, p. 244.

Elixir of Rhubarb—A new Vehicle for Castor Oil.—Mr. Bidone Carlo recommends the following as an excellent vehicle for castor oil:

Rhubarb, sliced,	20 parts.
Alcohol, 45 per cent.,	20 "
Cloves, ground,	8 "
Saffron,	8 "
Nutmeg,	20 "
Good common wine (white wine or sherry),	200 "
Ether,	10 "

Mix the drugs, put them into a glass vessel, pour on the alcohol and wine, and allow them to macerate for eight days in a warm place, frequently agitating. Then filter, add the ether, and preserve the product in a well-closed vessel.

The addition of 1 part of this elixir of rhubarb to 3 parts of castor oil causes the latter rapidly to lose its bad taste and smell, so that it may be readily administered to adults as well as to children.—From Bolletino Farmac., Milano, 1880, p. 184, in New Rem., August, 1880, p. 244.

Elixir of Cascara Sagrada.—Mr. H. L. Coit communicates the following formula: Fluid extract of rhamnus purshiana (see "Fluid Extracts"), 2 ounces; tincture of cardamom (simple), 4 drachms; ammoniacal glycyrrhizin, 30 grains; fluid extract of cacao bean, 2 ounces; simple elixir (Diehl's formula), sufficient to make 16 ounces. A tablespoonful, containing 20 minims of fluid extract, is a dose, which may be given three times a day. The author, however, thinks that a more efficient preparation results if the drug is combined with belladonna and nux vomica or strychnia, and recommends such under the name—

Elixir of Cascara Compound, which is made precisely like the above, with the addition of 64 minims of fluid extract of belladonna, and 1 grain of citrate of strychnia.—Drug. Circ., February, 1881, p. 19.

Elixir of Salicylic Acid.—Dr. Wolff furnishes the following: Dissolve ʒj salicylic acid in fʒvi alcohol, and add sufficient simple elixir (or elixir Curaçao) to make f℥vi. The taste is well marked, and the additional alcohol is not contraindicated.—Am. Jour. Phar., April, 1881, p. 191.

Compound Elixir of Chloroform.—Dr. W. F. McNutt proposes, under the name of "compound elixir of chloroform," the following substitute for chlorodyne: Muriate of morphia, gr. ss.; hydrate of chloral, ʒss; chloroform, ʒss; tincture of cannabis indica, ♏xx; tincture of capsicum, ♏xx; dilute hydrocyanic acid, ♏xx; essence of peppermint, ♏x; compound syrup of sarsaparilla, ℥j. Mix. Dose, one drachm. This, in his hand, has formed a perfect substitute for chlorodyne, with which he has had considerable and successful experience in certain cases of asthma, colic, diarrhœa, neuralgia, rheumatism, etc.—Drug. Circ., December, 1880, p. 244, from Western Lancet, August, 1880.

Elixir of Protochloride of Iron.—Mr. R. F. Fairthorne gives the following formula as a substitute for the preparation of Rabuteau: Protochloride of iron, 3 drachms, 12 grains; glycerin, 4 fluid ounces; white Curaçao, 12 fluid ounces; syrup, 4 fluid ounces; water to make 2 pints. Mix and filter.—Am. Jour. Phar., August, 1880, p. 409.

EMPLASTRA.

Plaster Spreading—Novel Process.—Mr. C. Thein recommends that the plaster mass be spread evenly upon a sheet of filtering-paper, then cut with the scissors to the required size, and pasted by means of a paste of gum arabic and prepared chalk upon muslin or plaster skin; or it may be fastened upon a sheet of adhesive plaster, which must for this purpose be gently heated. In this manner elegant plasters, resembling those made by the aid of machinery, are readily made.—Phar. Centralh., May 5th, 1881, p. 195; from Phar. Centr., August, 1880, No. 16.

Lead Plaster—Improved Process.—Mr. A. F. W. Neynaber makes some practical observations on the preparation of lead plaster, and gives the following formula, which has always given good results in producing a white plaster: Litharge, free from red lead, 30 pounds; sift into olive oil, 58 pounds; mix; add water, 2 gallons; boil two hours; add white sugar of lead, 1½ pound, previously dissolved in water, ½ gallon. Boil until sufficiently hard and white, stirring constantly while on the fire.—Drug. Circ., February, 1881, p. 18.

Substitute for Adhesive Plaster.—Dr. Addinell Hewson strongly recommends a mixture of common glue and acetic acid, spread on paper, gauze, or muslin. The mixture is prepared by liquefying the glue on a water-bath, with sufficient water to cover it, and slowly adding twenty-five per cent. of acetic acid to the liquid obtained. It is finally flavored with a few drops of otto of rose. It should be kept in a wide-mouthed bottle, well stoppered with a long cork, which may be easily removed by heating the neck of the bottle. The material is saturated with this liquid glue and applied to the parts, the thickness or quantity varying with the object.—Drug. Circ., December, 1880, p. 215.

Morgan's Elastic Plaster.—Take thin sheet-rubber and apply to it a coating of Boynton's plaster, namely: Lead plaster, 94 parts; resin, 6 parts.

This plaster has the advantage of accommodating itself to all movements of the muscles without curling up or becoming stiff, and has been used with good advantage as a dressing to sores and wounds.—New Rem., March, 1881, p. 85.

A Novel Plaster.—Greek wine is very commonly preserved, for want of casks, in lamb, sheep, or goat skins. Most of the Greek wines intended for domestic use are treated with pitch, in order to better preserve them. In the course of time the pitch is gradually deposited upon the interior of the skin, and, after the wine is used up, this pitch-covered skin is cut up into plasters, which are highly valued. Such a pitch-covered skin is called *ρετζινοτομάρι* (rosin-hide).—Professor X. Landerer, in New Rem., August, 1880, p. 231.

EXTRACTA.

Green Extracts of the Br. Phar.—Mr. W. A. H. Naylor has contributed a very practical paper intended to convey the experience of a laboratory in reference to the preparation of the "green" extracts of the Br. Phar. The observations were based chiefly on

Extr. Belladonnæ.—The first point urged was that, the plant having been obtained, no time should be lost in working it, but while in a fresh condition it should be stripped of the leaves and flowering tops. The bruising of these is accomplished by stone runners, or in a grinding-mill. They are next inclosed in a hair cloth and submitted to pressure. If the material has not been perfectly broken up, little spaces will be formed, which will render the extraction of the juice difficult. The specific gravity of the juice ranges from 1.015 to 1.035, average 1.020, and in an ordinary season a ton of the leaves and young stems would give 130 gallons (imperial measure) of juice. The juice is then deprived of chlorophyll (at 130°) and then of albumen (at 200°), and it is well to remove the scum as it rises during the heating of the liquor. Regarding the removal of the albumen, the author is not certain that it is necessary or expedient; the albumen-coagulum amounts to about 1 ounce in 16 of finished product, to which extent it would dilute it, but then it is not conclusively proven that the coagulum may not possess some activity. The temperature of final evaporation should not exceed 212° F., and if the operation is conducted *in vacuo*, the product is superior to that which can be made by pharmacists in the ordinary manner, since the oxidizing action of the air, as well as high temperature, is thereby avoided. Mr. Naylor is inclined to regard the presence of gum, derived from the peduncles and young stems, as calculated to preserve the extract, and that it should therefore be made from all the soft parts of the plant rather than from the leaves alone, as pointed out by Mr. Squire twenty years ago. Indeed, he had found the addition of a small percentage of gum to an extract, which when fresh is known readily to mould, to materially retard the period of decay. The coagulum of chlorophyll should be added when the juice has the consistence of thick, not thin, syrup, and it should first be rubbed through a fine sieve. The yield of extract from belladonna plant varies considerably, but 80 to 90 pounds per ton may be taken as the average result.—Chem. and Drug., September, 1880, p. 387; from. Proc. Br. Phar. Conf., 1880.

Dry Narcotic Extracts—Preparation.—According to W. Kirchmann, dry narcotic extracts of excellent quality are obtained by mixing the extract with an equal weight of exsiccated sulphate of sodium, drying the mixture completely at a temperature not exceeding 50° C., and adding sufficient exsiccated sulphate of sodium to make the weight of the mixture equal to twice the weight of the extract employed.—Am. Jour. Phar., May, 1881, p. 247; from Pharm. Ztg., 1881, p. 116.

Bonjean's Ergotin—Preparation.—C. Lewis Diehl has made comparative experiments with various methods that have been recommended, and are in use, for the preparation of Bonjean's ergotin. He found that ergot is very readily extracted with cold water by displacement, and that therefore the preliminary extraction of the powder by ether, sometimes recommended, is not necessary. Operating with 45 troy ounces of the drug, the first 45 fluid ounces of percolate contained 86 per cent. of the total quantity of soluble matter; the second contained 10 per cent., and the third only 4 per cent. This shows that for practical purposes the quantity of infusion by percolation need not exceed two parts from one part of ergot, and that if this quantity is collected fractionally, and each fraction is evaporated separately, the exposure to heat and air is reduced to a minimum. The first portion of 45 fluid ounces contained 4061 grains dry extract; the second 477 grains, and the third 175 grains. These portions were concentrated on the water-bath so that the residues weighed just twice that of the dry substance contained in them, and proper proportions of the syrupy liquids were then treated: 1, by the method of Bonjean; 2, by the method of Carles (see "Proceedings," 1878, p. 96), and claimed by him to be that of Bonjean; and, 3, by the process of the Germ. Pharm., which it is also claimed yields a preparation corresponding to Bonjean's ergotin. The results may be briefly stated as follows: By the method of Bonjean 11.57 of ergotin was obtained; that from the second and third portion was more or less granular in appearance, while that from the first portion, and constituting the bulk, was homogeneous, dark brown, and translucent. The method of Carles yielded 11.05 per cent. of ergotin, having the same characters as that obtained by Bonjean's method, and showing that the large quantity of alcohol required in the process of Carles is not necessary. The process of the Germ. Pharm. yielded 21.8 per cent. of extract, which resembled the others in odor, solubility, etc., but was a shade darker. The author considers it probable that by the first two processes, which are practically identical, the scleromucin is eliminated, while the preparation of the Germ. Pharm. contains both the scleromucin and sclerotic acid. He considers it of importance that the infusion of ergot should be evaporated to a definite weight, and that strong alcohol be added in such quantity as may uniformly produce a mixture of definite alcoholic strength; the undissolved portion may then be washed out with alcohol similarly reduced in strength, if it is considered advisable, and a uniform product thus secured. The ergotin, also, should be concentrated so as to retain a definite quantity of water. That made by the above processes was made to retain just 10 per cent.—Proceedings Ky. Pharm. Assoc., 1880.

Ergotin—Preparation.—E. Schmitt has contributed a review of the active components of ergot, as well as of the various ergotins, and the methods proposed for their preparation. As a result of his studies he recommends the process of Bonjean, modified in the direction indicated by Lepage, and the Bordeaux Society of Pharmacy. Taking a kilogram of ergot, for example (fresh and undried, if this is possible), it is reduced to a coarse powder, and placed in a bottle of five liters capacity; the bottle is filled with distilled water, closed, and shaken frequently. At the end of twenty-four hours, after allowing it to deposit during the night, the liquid is decanted, and its evaporation commenced in a tared vessel on a water-bath. The bottle is refilled with water and again shaken; then, after a maceration of six hours, the liquor is decanted and added to the previous product. Another liter of water is added to the ergot and left in contact during two hours, then the whole is thrown on a strainer and pressed. The third liquor is added to the other two, and the whole is evaporated rapidly to 500 grams. It is now allowed to cool to 50° C., and poured into a liter-flask; the dish is rinsed with a little 92° alcohol, which is added to the other liquid, and the flask is completely filled with strong alcohol, after which it is closed, shaken, and placed in a cool place. After twenty-four hours the liquid is filtered through paper, and the filtrate is evaporated in a water-bath to the consistence of a firm extract. A yield of about 8 per cent. of ergotin is thus obtained. This ergotin is of a red-brown color, and has a smell like that of roast meat; its taste is bitter and piquant. It contains 10 per cent. of water and leaves 6 per cent. of salts upon incineration. It dissolves nearly completely in water, and this solution is facilitated by first suspending the extract in a little glycerin. It is soluble in 60° alcohol. The author recommends the administration of powdered ergot whenever this is possible. For hypodermic injection he recommends, for the present, Bonjean's ergotin, prepared as above.—Pharm. Jour. Trans., July 10th, 1881, pp. 23–25, from Bull. de la Soc. de Phar. de Bordeaux, vol. xx, p. 40.

Extr. Chinæ Frigide Paratum—Ph. Germ.—Variability.—C. Schneider, in view of a statement that this extract often contains very little alkaloid, has made a number of extracts from different varieties of bark and subjected them to comparative examination. He concludes that, owing to the variable quality of *Cortex chinæ fuscus*, and the fact that these barks mainly contain lævogyre alkaloids, the extract may often contain only an insignificant quantity of alkaloids, whilst calisaya bark and the cultivated (East Indian) succirubra, which contain dextro-rotatory alkaloids in large proportion, will yield very acceptable extracts. But these preparations become very expensive since the left-rotatory alkaloids, amounting from $\frac{1}{2}$ to $\frac{4}{7}$ of the total, escape solution and are wasted.—Arch. d. Pharm., August, 1880, pp. 102–109.

Extract of Butternut—Relative Value when Prepared with Different Menstrua.—Mr. B. F. Morse, Jr., prepared extracts from the bark of *Juglans cinerea* with water, alcohol and dilute alcohol. Using the same quantity of bark in each case (though the precise quantity is not given) he obtained with water 77 grains, 20 to 30 grains of which proved to be an efficient cathartic; with alcohol 166.6 grains were obtained, 5 grains of which acted as a good purge, while 10 grains proved to be quite actively cathartic; with diluted alcohol 157.2 grains of extract were obtained, 5 grains of which were found to be nearly equal to 10 grains of the extract made with alcohol.—Am. Jour. Phar., April, 1881, p. 153.

Extractum Physostigmatis—Dose.—Mr. Phil. Hoglan draws attention to the unusually large doses of extract of calabar bean given in "Bartholow's Treatise on Materia Medica and Therapeutics," wherein the dose is given at one-sixth to one-half, and even so high as five grains, while the U. S. Dispensatory gives the dose at from one-sixteenth to one-sixth of a grain, and one-fourth of a grain is the highest dose mentioned. This great discrepancy has led him to make some inquiries, which have elicited a reply from Professor J. M. Maisch. According to this the smaller doses are the ones usually accepted as correct; but in certain cases it may be given in quite large doses. Professor Stillé gives the *minimum* dose of extract of physostigma in tetanus at *one third* of a grain, to be repeated every quarter of an hour until its specific action is developed and the spasms are completely overcome, and it has been given in doses of *four grains every hour* during an attack of traumatic tetanus, and even larger doses have been given. Nevertheless, the latter must be regarded as very unusual doses, and, inasmuch as the remedy is very active and even dangerous, it should never be dispensed in doses exceeding the average without previously ascertaining that the attending physician really intends to give such a quantity and is aware that it is an unusual dose. —Am. Jour. Phar., May, 1881, pp. 229–232.

EXTRACTA FLUIDA.

Fluid Extract of Colchicum Seed—Preparation from Recent Seed.—Dr. F. Mols is of the opinion that colchicum seed very readily loses its activity by keeping, and that it is safe only to use the recent seeds, which should as soon as possible be converted into a fluid extract. To secure such a preparation he has the seeds collected for him (near Heidelberg), moistened with alcohol, and packed air-tight, in which condition they are shipped to Chicago. On arrival, they are dried, coarsely ground, moistened with 90 per cent. alcohol, allowed to stand twenty-four hours, and then digested on a water-bath with three times their weight of 90 per cent. alcohol. After cooling, the tincture is expressed, and distilled to one-half the weight of the seeds. The residual seeds are now exhausted by first macerating for twenty-four hours, and then subjecting to displacement, with hot distilled water until deprived of bitterness; the infusion is evaporated to one-half the weight of the seeds, the concentrated aqueous liquid is added to that previously obtained by alcohol, and the two are well mixed and allowed to stand four or five days. The dark-green fixed oil, which separates, is carefully removed from the surface, and the clear residual fluid extract brought to the original weight of the seed by the addition of 90 per cent. alcohol. From a pound of extract made in this way he obtained 15 grains of colchicia, while 5 samples of fluid extracts purchased in the market yielded none at all. The "fixed oil," separated in the above process, may find application for external purposes in acute rheumatism.—D. A. Apothek. Ztg., August 15th, 1880, p. 1.

Fluid Extract of Wild Cherry Bark—Improved Process.—Mr. J. B. Moore offers the following process for the preparation of this fluid extract, which will restore it to its original strength (½ troy ounce to 1 fluid ounce), and which yields a thorough representation of the bark: Moisten 16 troy ounces of wild cherry bark, in powder No. 50, with 12 fluid ounces of a mixture consisting of 11 fluid ounces of water, temperature 130°, and 3 fluid ounces of glycerin; pack the moistened bark firmly in a suitable air-tight vessel, and set it aside in a moderately warm place to macerate for four days. Then pack it firmly in a glass percolator, and pour upon it first the remainder of the menstruum, and when this has passed from the surface, pour gradually upon it 27 fluid ounces of a mixture consisting of 7½ fluid ounces each of glycerin and stronger alcohol, and 12 fluid ounces of water, and when this has been absorbed continue the percolation with water until 32 fluid ounces of percolate are obtained. From this fluid extract a most excellent "syrup of wild cherry" may be made by mixing together 5 fluid ounces of the fluid extract, 2 fluid ounces of glycerin, and 9 fluid ounces of fresh syrup. The addition of glycerin is necessary to form a clear syrup.—Drug. Circ., June, 1881, p. 82.

Fluid Extract of Rhamnus Purshiana—Preparation.—Mr. H. L. Coit finds that Rhamnus Purshiana yields its virtues best to equal measures of stronger alcohol and water. It should be prepared without the slightest application of heat, the drug in fine powder being packed moderately firm and percolated. A pint of the finished preparation should weigh 7640 grains.—Drug. Circ., February, 1881, p. 19.

GLYCERITA.

Glycerole of Cinchona.—Mr. Fred. Loos, Jr., recommends a glycerole of cinchona. Sixteen troy ounces of cinchona bark, in moderately fine powder, 12 troy ounces of glycerin, and 3 fluid ounces of alcohol are mixed and allowed to stand five days; the mixture is then packed in a percolator and displaced with a menstruum composed of 2 parts of alcohol and 1 part of water until exhausted. The first 12 fluid ounces are set aside, the remainder is concentrated to 4½ ounces, and, when cold, mixed with the reserved portion; after standing several days it is filtered. To mask the extreme bitterness of this preparation, the author recommends an

Aromatic Glycerole of Licorice.—This is prepared by moistening 2 ozs. of licorice root, 1 oz. of cinnamon, and 2 drachms each of cloves, anise, and caraway, all in fine powder, with 4 ozs. (troy) of glycerin and sufficient diluted alcohol; packing the moist powder in a percolator, and displacing with dilute alcohol to exhaustion. The first 3 fluid ounces are set aside, the remainder is evaporated to 1 fluid ounce, allowed to cool, mixed with the reserve, and the mixture filtered.

Aromatic Glycerole of Cinchona is produced by mixing equal volumes of the above glyceroles. These may be reduced to any desired strength by the addition of a mixture of 2 parts of alcohol and 1 part of water.—Am. Jour. Pharm., October, 1880, p. 483.

Glycerite of Thymol.—The following formula is given in "Pharm. Centralh." (April 14, 1881, p. 167): Thymol, 1.2 gram; glycerin, alcohol, āā 30 grams; aq. dest., 540 grams, M. Diluted with water this forms a very effective antiseptic mouth-wash.

LINIMENTS.

St. John Long's Liniment.—Mr. J. B. Moore prepares this as follows: Mix 12 fluid drachms of rose water and 4 fluid drachms of acetic acid in a bottle, and 3 fluid ounces oil of turpentine and 40 minims oil of lemon in a graduated measure; then rub the yolk of one egg in a mortar with 2 fluid drachms of the acidulated rose water to a smooth uniform mixture. Transfer this to an eight-ounce bottle, and add to it 3 fluid drachms of the oil mixture; shake the mixture vigorously for several minutes. In like manner alternate the two mixtures, shaking well after each addition, until all has been added. The emulsion so formed will stand for a long time without separating.

Stokes's Liniment, which is analogous to the above, may be made in a similar manner.—Drug. Circ., September, 1880, p. 162.

Remedy for Frostbites.—Dr. H. E. H. Barnes recommends a mixture of equal parts of copaiba and oil of turpentine, with which the frostbitten parts are to be kept constantly saturated, and covered with absorbent cotton. It may be applied in an ulcerated or even gangrenous condition, has a soothing feeling to the patient, and rapidly restores the circulation to its normal condition.—Am. Jour. Pharm., March, 1881, p. 256; from Med. and Surg. Rep., March 26, 1881.

Alcoholic Solution of Animal Soap—A New Vehicle for External Application.—P. Ceresoli observes that fatty substances obstruct transpiration by stopping the pores of the skin. He recommends as a substitute a solution of animal soap in alcohol of 95 per cent., which serves well for frictions of potassium iodide, chloroform, extract of belladonna, laudanum, etc. A solution of 116 parts of soap in 800 parts of alcohol should be kept for dispensing with tincture. 120 parts of iodide of potassium may be dissolved in 800 parts of alcohol and 90 parts of soap added.—New Rem., July, 1880, p. 212; from Rép. de Pharm., and Chem. and Drug.

LIQUORES.

Liquor Opii Sedativus—Battley's Sedative.—Mr. E. B. Shuttleworth states that the strength of this preparation varies exceedingly as dispensed in different localities, and that it should correspond in strength to the liquid extract of opium of the British Pharmacopœia, viz., 1 grain of opium in 11 minims. He believes that a preparation in every way acceptable is obtained by extracting the opium with water, evaporating by boiling to an extract, redissolving in water, again evaporating, and repeating this several times to secure the thorough separation of narcotine, meconin, meconic acid, resinous, odorous, and extractive matters; finally, to dissolve in water, and adding a little spirit to preserve it from change. The preparation should be assayed to contain 3 grains of morphia to the ounce. Such a preparation, he states, will be identical with the original solution of Mr. Battley. The preparation usually dispensed in Canada varies in strength from 12.5 to 25 per cent. of opium.*—Canad. Phar. Jour., February, 1881, pp. 195–198.

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* The stronger of these (25 per cent.) corresponds nearer to the preparation usually dispensed than that recommended by Mr. Shuttleworth. It is also generally understood to be a preparation of fermented opium, the opium being subjected to fer-

Magendie's Solution—Preservation.—Dr. H. M. Keyes recommends adding one grain of salicylic acid to two ounces of the solution. This has been successfully employed in Roosevelt Hospital for some years.—Am. Jour. Pharm., December, 1880, p. 601; from Phila Med. Times, November 6th, 1880.

Concentrated Solution of Quinia.—Mr. S. W. Reynolds, in a long experience, has found the following formula to furnish a perfectly stable solution, which may crystallize during very cold weather, but rapidly forms a solution again by warming:

Take of

Sulph. quinia,	480 grs.
Diluted sulphuric acid,	fʒvj to f℥j.
Glycerin,	fʒvj.
Water,	q. s. to make f℥vj.

Dissolve, mix, and filter.

The smaller quantity of dilute sulphuric acid is sufficient in warm weather, but the larger quantity is required in winter.—Am. Jour. Pharm., April, 1881, p. 177.

Hypodermic Solution of Quinia (Lent's).—The following formula is given in "Am. Jour. Pharm." (March, 1881, p. 136):

℞. Quiniæ sulphat.,	gr. 80.
Aquæ,	f℥j.
Acidi sulphur. dil.,	q. s.
Heat to boiling and add	
Acidi carbolici,	gr. 5.

Clear Solution of Caoutchouc—Preparation.—Dr. Eder and V. Tóth give the following directions: Inclose 30 grams of finely cut caoutchouc in a capacious linen bag, and suspend this within a flask containing 1 liter of benzin, by means of a thread held fast by the stopper so that the bag remains near the surface of the liquid. In the course of six or eight days the soluble portion of the caoutchouc,

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mentation along with brewer's yeast, some sugar or honey being sometimes added to prolong the fermentive action. Hager (Pharm. Praxis, II, p. 597) classes this under tinctura opii nigra, and gives as synonyms, tinctura opii fermentata, acetum opii, etc., and states that its strength varies from 20 to 30 parts of opium in 100. A formula which has been handed down to me from a reliable source, directs the preparation of an extract from opium which has been fermented, its solution and evaporation several times in water, and its final solution in water in such proportion that after the addition of about one-fifth its volume of alcohol it shall represent 1½ ounce of the extract in 1 pint (wine measure). This would correspond to very nearly 25 per cent. of opium, since the extract obtained in the above manner is smaller in quantity than that obtained in the usual way. It is very desirable that uniformity should be secured in the strength of this preparation, particularly if, as Mr. Shuttleworth states, there exists so wide a range. But it seems injudicious to reduce the strength so greatly if the statements of Hager and others are correct.—Rep.

about 40 to 60 per cent., will pass into the benzin, while the contents of the bag will swell to an enormous size. The clear limpid solution, which is quite viscous and contains 1.2 to 1.5 per cent. of caoutchouc, is then carefully separated. The swelled contents of the bag retain one-quarter to one-third of the benzin used, and may be utilized for the preparation of an inferior grade of caoutchouc varnish.

The authors also state that a solution of caoutchouc in benzin, kept in half-full bottles, is decomposed on exposure to light, which may be seen by the change of the solution from a viscous to a thin fluid condition. Even in the dark this change goes on, but it requires about three times as much time.—New Rem., June, 1881, p. 184.

Solution of Acetate of Ammonium.—Mr. R. Rother is of the opinion that a more concentrated solution should be substituted for the present weak preparation, and recommends the following, which is eight times as strong as the officinal:

Take of

Ammonium carbonate, translucent,	4 troy oz.
Glacial acetic acid,	4¼ troy oz. or sufficient.
Water,	sufficient.

Dilute the acid with its volume of water and add the carbonate in small fragments, gradually at first, and aid the combination by frequent stirring. When effervescence has ceased, or nearly ceased, and undissolved portions remain, decant the solution and on the residue pour sufficient water to dissolve it; then add acid to the solution until effervescence ceases or until the liquid is slightly acid. Unite this solution with the first and then add water to measure of 12 fluid ounces and mix. The solution should have a faint acid reaction.—New Rem., December, 1880, p. 354.

Neutral Mixture—Substitute.—The addition of 5 grains per fluid ounce of sugar and a small quantity fresh lemon-peel to the ingredients for solution of citrate of potassium, furnishes, according to Mr. R. F. Fairthorne, an agreeable substitute for the officinal neutral mixture.—Am. Jour. Pharm., November, 1880, p. 541.

Acid Phosphates—Simple and Compound.—Mr. James T. Shinn, referring to a paper by Dr. Wm. Pepper, in which the composition of Horsford's acid phosphates is given, has modified these formulas and gives the manipulation:

Liquor Acidi Phosphorici.—Carbonate of calcium, 369 grains; calcined magnesia, 116 grains; carbonate of potassium, 151 grains; syrupy phosphoric acid (60 per cent.), 1721 grains; water, sufficient to make one pint.

Liquor Acidi Phosph. Comp.—Carbonate of calcium, 369 grains; calcined magnesia, 29 grains; carbonate of potassium, 25 grains; phosphate of iron, 64 grains; syrupy phosphoric acid (60 per cent.), 1705 grains; water, sufficient to make one pint.

Mix the acid with half a pint of water, add the phosphate of iron (for the compound solution), and stir until dissolved, then add gradually the carbonate of calcium, stirring until the freshly-formed phosphate is dissolved, and finally add the magnesia and carbonate of potassium; stir until dissolved, and make up the measure to one pint with water. On standing for several days a slight precipitate occurs, which may be prevented by slightly increasing the amount of acid.—Am. Jour. Pharm., October, 1880, p. 481.

Solution and Tincture of Perchloride of Iron—Presence of Arsenic.—Mr. F. W. Fletcher enumerates several observations of the presence of arsenic in pharmaceutical preparations, and adds to the list the tincture and solution of perchloride of iron, which he had obtained from various eminent dispensing houses. In one instance the proportion of 33.8 grains As_2O_3 in 100 fluid ounces of the liquor were detected. In other instances 10, 12, and 13 grains per 100 fluid ounces of liquor.—Chem. and Drug., September, 1880, p. 388; from Proc. Brit. Pharm. Conf., 1880.

Solution of Chloride of Iron—Estimation of Strength.—Mr. Homer McCoy estimates the amount of ferric chloride in solution of chloride of iron by first reducing the ferric salt to the ferrous salt by the agency of metallic zinc, and then titrating with a standard solution of permanganate of potassium. He has found a commercial sample of solution of chloride of iron to be very deficient in strength, containing 13.1 per cent. of anhydrous ferric chloride, whereas the officinal solution contains 37.1 per cent.—Am. Jour. Pharm., December, 1880, p. 598.

Liquor Ferri Chloridi—Administration.—Dr. Hager states that solution of ferric chloride may be made palatable (freed from ferruginous taste), and its action upon the teeth prevented, if a mixture of it with glycerin or syrup is diluted with cow's milk immediately before it is taken. He believes this to be due to the formation of a ferric protein compound, but considers that this in no way interferes with its effectiveness.—Pharm. Centralh., November 11th, 1880, p. 408.

Dialyzed Iron—Preparation.—Mr. R. Rother states that the so-called dialyzed iron of the market is not prepared by dialysis. It is nevertheless the veritable article as produced by the dialytic process, but obtained by a much-improved method which consists in dissolving well-washed ferric hydrate in hydrochloric acid. On the basis of his experience and observations he proposes as a substitute for the dialyzed iron of the market the following: Upon 15 troy ounces of disodic carbonate pour half a pint of water and apply heat until a hot solution is obtained, then pour into this one pint of solution of ferric sulphate in a rapid and continuous stream and with constant stirring of the mixture. Keep up the heat a few minutes until effervescence nearly ceases, and add water to the measure of 2 gallons. After a sufficient repose, decant the supernatant liquid and wash the precipitate three or four more times in a similar manner, or until the washings yield no trace of reaction with barium chloride. Collect the ferric hydrocarbonate upon a filter, and when the excess of water has drained away, dissolve it in one troy ounce of chlorhydric acid with the aid of heat, and evaporate to the measure of one pint, if necessary. —New Rem., January, 1881, p. 4.

Dialyzed Iron.—Dr. H. Hager observes that the discredit into which this preparation has fallen with some is not borne out by the experience of others. He regards it to be really a valuable form of iron, possessing many advantages over those generally used for internal exhibition. It is easy to take, does not discolor the teeth, and does not induce constipation. He regards it, indeed, to be the most effectual of all iron preparations. Regarding the gelatinization, he says that this may be caused by ammonia in the atmosphere, from which it should be protected. It can be restored by the careful addition of solution of ferric chloride, observing that the addition shall not be great enough to give a reaction with nitrate of silver.—Pharm. Centralh., October 28th, 1880, p. 387.

Dr. Klamann also speaks strongly in favor of dialyzed iron. He regards its action as prompt, and names the same advantages over other preparations of iron that are more popular.—Ibid., November 4th, p. 398.

Liquor Ferri et Ammonii Succinatis.—Prof. W. T. Wenzell finds that a permanent solution of succinate of iron in citrate of ammonium may be made as follows: Dissolve 50 grains of succinic acid in 3 fluid ounces of water, neutralize nearly with ammonia and dilute to 6 fluid ounces. Transfer the solution to an eight-ounce bottle, add half a fluid ounce of the officinal liquor ferri persulphatis and agitate well. Transfer the mixture to a filter and wash the precipitated ferric succinate thoroughly with distilled water. Next take 89 grains of citric acid, put it into a beaker, and add, with stirring, a sufficient quantity of water of ammonia until the acid is dissolved and the solution neutral.

Finally, transfer the moist ferric succinate to a porcelain capsule, add the solution of ammonium citrate, and dissolve, assisted by a gentle heat.

This solution, when diluted to measure 6 fluid ounces, will contain to the fluid drachm 2 grains of the ferric succinate, $Fe_2O(C_4H_4O_4)_2$, or 5 grains of the double salt.—New Rem., February, 1881, p. 40.

Solution of Hypochlorite of Zinc—Preparation.—Mr. R. F. Fairthorne draws attention to the superiority of a solution of hypochlorite of zinc over Labarraque's solution, and gives the following process for its preparation: Dissolve 24 troy ounces of sulphate of zinc in 3 pints of water. Triturate 12 troy ounces of chlorinated lime, with portions of water added slowly, until 9 pints have been used. Allow the undissolved matter to subside, decant the clear liquid, and drain the sediment on a muslin strainer until, with the decanted portion, 8 pints of clear liquor are obtained. Mix this with the solution of sulphate of zinc, set the mixture aside for twelve hours, decant the clear liquid, transfer the precipitate to a muslin strainer, allow to drain, and then pass through sufficient water, if necessary, to make 11½ pints of finished solution. The resulting preparation possesses the disinfecting and bleaching properties of hypochlorous acid combined with the astringent and antiseptic virtues of the zinc compounds, and is free from alkalinity.—Am. Jour. Pharm., March, 1881, p. 97.

Fehling's Solution—Improved Formula.—Schreiter proposes the following formula, which furnishes a solution corresponding to Fehling's, but keeping perfectly well:

Salicylate of sodium, sulphate of copper, āā . .	20	grains.
Caustic soda, ...	100	"
Distilled water, ...	400	"

—Drug. Circ., October, 1880, p. 182.

Liquor Arsenicalis Bromati Clementis—Preparation.—According to "Pharm. Zeitschr. f. Russl." (1880, p. 573), this solution is made by dissolving 3.75 grams each of pure carbonate of potassium and arsenious acid in sufficient water to make 360 grams of liquid, adding 7.5 grams of bromine, and setting aside until the solution is colorless. It is given, in epilepsy, in doses of one or two drops twice a day, and is said to improve by age.—Am. Jour. Pharm., December, 1880, p. 602.

MISTURÆ.

Emulsions.—Mr. Emil G. H. Graff has gone over the entire field of emulsionizing, and contributes a very interesting paper in "Am. Jour. Pharm." (June, 1881, pp. 286–292). The author divides his subject into five classes. 1. Emulsions of oils, liquid balsams, oleoresins, resinous fluid extracts, and tinctures. 2. Emulsions of semi-liquid and solid balsams, solid fats, and camphors. 3. Emulsions of gum-resins. 4. Emulsions of resins. 5. Emulsions of seeds. The paper is of a character that does not admit of much condensation. It may be observed, however, regarding the emulsions of the first class, which is the most important, that the author gives decided preference to gum arabic. He observes that the most perfect emulsion results when the proportion of gum to oil is as 1 is to 2; but a larger proportion may be incorporated, and he gives preference to the following: "Take *one* part of gum arabic, triturate it with two or more parts of oil, then add *two* parts of water at once, stir briskly until the emulsion is formed, lastly add the remainder of the water."

If other ingredients have to be added to an emulsion, the following rules are to be observed:

1. Never add to an emulsion a hot liquid. This rule is important when, instead of water, the emulsion has to be made with an infusion or decoction; such liquids must be allowed to cool perfectly before using them.

2. When sugar, syrup, extracts, acids, salts, alcohol, and ethereal liquids have to be added, the emulsion is to be diluted previously to the fullest extent possible. Among the salts, the lead and iron salts require the most caution. Acids, tinctures, especially those made with strong alcohol and spirit of nitrous ether, are first diluted with water before adding them to emulsions. Borax added to an emulsion made with gum arabic coagulates with the gum to a thick paste. A sufficient quantity of sugar or syrup will dissolve it again. The most difficult addition to an emulsion is tincture of chloride of iron. By diluting, however, both the tincture and the emulsion to the fullest extent possible, and then adding the diluted tincture in small quantities at a time, even this can be added.

Emulsification with Tincture of Quillaia.—"W. H. M." has endeavored to utilize tincture of quillaia (as suggested by Mr. H. Collier, see "Proceedings," 1880, p. 60) for emulsionizing castor oil and cod-liver oil, but none of the emulsions made, though in different ways and proportions, retained their emulsified form for any considerable time. The following formula and process gives a reliable emulsion, in which, it will be observed, gum tragacanth and lime-water are used along with tincture of quillaia: Put 1 drachm of powdered tragacanth with 1 ounce of glycerin, and add sufficient boiling water to convert it into a thick jelly. When cool, add 15 ounces of cod-liver oil previously mixed with 5 ounces of lime-water; flavor with oil of bitter almonds. Lastly, to each 16 fluid ounces of the finished emulsion add 2 drachms of tincture of quillaia and mix well.—Drug. Circ., June, 1881, p. 82.

Emulsions—Use of Irish Moss.—Dr. Huested recommends the use of a mucilage prepared from 2 drachms Irish moss to 1 pint of water for emulsifying cod-liver oil, and from 2 drachms of the moss to 12 fluid ounces of water for emulsifying castor oil. Before using the mucilage, however, he adds 3 fluid ounces of glycerin to each 13 fluid ounces of the mucilage prepared as above. Without this addition the emulsions did not keep well. Emulsions containing 50 per cent. of oil were perfectly homogeneous after three months. The oil-globules are, however, not so minutely divided as in emulsions made with gum arabic.—Drug. Circ., June, 1881, p. 81; from Proc. N. Y. State Pharm. Assoc., 1881.

Emulsion of Cod-Liver Oil.—Mr. M. Eisner recommends the preparation, in quantities, as follows: Cod-liver oil, 4 parts; powdered gum arabic, 1 part; triturate together and add water, 1½ parts. An emulsion forms almost instantaneously. Now, stirring well, add 4 parts more of cod-liver oil and water in small portions, and finally enough water to make 16 parts. At the dispensing-counter, when small quantities up to a pint are prescribed, the second step (*i. e.*, the incorporation of more oil) is omitted, the quantity being simply brought with water to 8 parts. In either case a 50 per cent. emulsion is obtained.

Emulsion of Cod-Liver Oil with Lactophosphate of Lime is made with the same manipulation, etc.; but in place of making up the final weight with water, 64 grains of lactophosphate of lime, dissolved in a little mineral water and 1 ounce of simple syrup, are added to each pint.

Emulsion of Cod-Liver Oil and Wild Cherry is prepared like the simple emulsion, substituting for the water a concentrated infusion of wild cherry, prepared by cold percolation in the proportion of 1 pound of bark to the pint.—D.-A. Apothek. Zeitg., September 1st, 1880, p. 3.

Emulsions.—Mr. A. W. Gerrard has made some forty experiments in the preparation of emulsions with the mucilages of tragacanth and acacia, and likewise with their powders. Previous experiments had proven that where honey, yolk of egg, and almond-powder were recommended for special purposes, acacia or tragacanth answers equally well or better.

The conclusion arrived at was altogether in favor of *powdered acacia*, which should be of the best quality and almost white.

Mr. Gerrard prepared a castor-oil emulsion before the Conference with perfect success, and he then gave the following formulas, urging strongly that the directions should be exactly followed, the liquids accurately measured in separate measures, mixed in a dry mortar, and no rule of thumb admitted.

Emulsion of Cod-Liver Oil.

Cod-liver oil,	4 ounces.
Powdered acacia,	1 ounce.
Essential oil of almonds,	4 minims.
Syrup,	1 minim.
Water,	to 8 ounces.

Mix the gum with the oil, then place on the mixture 2 ounces of water, and stir until the emulsion is formed, then add the remainder, —water, essence, and syrup.

Emulsion of Castor Oil.

Castor oil,	4 drachms.
Powdered acacia,	80 grains.
Essential oil of almonds,	1 minim.
Simple syrup,	2 drachms.
Water,	to 2 ounces.

Mix the powder with the oil, then add 2 drachms of water, stir until the emulsion is formed, then add the remainder,—water, syrup, and essence.

Emulsion of Turpentine Oil.

Oil of turpentine,	4 drachms.
Powdered acacia,	2 "
Syrup,	2 "
Water,	to 2 ounces.

Mix the powder with the oil, add one-half ounce of water, and stir until the emulsion is formed, then add the remainder of the syrup and water.

Oil of turpentine is considered one of the most troublesome bodies to emulsify; prepared by this form there is no difficulty.

Emulsion of Balsam of Copaiba.

Balsam of copaiba,	3 drachms.
Powdered acacia,	3 "
Simple syrup,	6 "
Water,	to 6 ounces.

Mix the powder with the balsam and add 6 drachms of water, stir until the emulsion is formed, then gradually add the remainder of the water and syrup.

Emulsion of Resin of Copaiba.

Resin of copaiba,	2 drachms.
Alcohol,	4 "
Powdered acacia,	4 "
Water,	to 6 ounces.

Dissolve the resin in the spirit, add the powdered gum, and mix well; add now an ounce of water, stirring until the emulsion is formed, and make up to 6 ounces with water.

Emulsion of Balsam of Peru.

Balsam of Peru,	3 drachms.
Powdered acacia,	2 "
Simple syrup,	6 "
Water,	to 6 ounces.

Rub the powder well with the balsam, add 3 drachms of water, and stir till the emulsion is perfect, then add the remaining water and syrup.

In emulsions containing resins or bodies heavier than water, there is generally a sediment formed; it is so with the two previous forms, but there is no aggregation into a hardened mass, and a slight shake of the bottle puts everything to rights again.

Emulsion of Chian Turpentine.

Chian turpentine,	2 drachms.
Ether,	4 "
Powdered acacia,	2 "
Water,	to 6 ounces.

Dissolve the turpentine in the ether, and filter, washing the filter with a drachm of ether, mix well with the gum and add one-half ounce of water, stirring till the emulsion is perfect, lastly add the remaining water.

During the discussion of this paper, Mr. Cottrell gave the formula of an emulsion which he prepared on a large scale, and which he said kept perfectly. It is formed by working together 24 eggs, 6 ounces of mustard, and 2 pounds of crystallized brown sugar, until a crackling noise is heard; then 64 ounces of the finest oil (of whatever kind) are added, with 4 pints of vinegar, 3 ounces of Tarragon vinegar, and the necessary spices.—Chem. and Drug.; New Rem., December, 1880, 371; Year-Book of Pharm., 1880; Am. Jour. Pharm., November, 1880, 560.

Effervescent Castor-oil Mixture.—Mr. R. F. Fairthorne recommends the following as a palatable way of administering castor-oil: Dissolve 25 grains of tartaric acid in f℥iv of water, add fʒj caramel, f℥ss. syrup of gum arabic, and f℥j syrup of orange peel, mix them and pour the dose of castor-oil on top. Dispense this with 30 grains of bicarbonate of soda, wrapped in a paper, which can be marked effervescent powder. When the patient is to take the dose, the soda powder is added and well stirred, producing a thick froth, which completely envelops the oil.—Am. Jour. Pharm., July, 1880, p. 372.

Castor-oil Emulsion.—The following is recommended by Mr. Charles A. Heinitsh, of Lancaster, Pa., who states that it contains 50 per cent. of oil, is palatable, does not gripe, and given in the dose of an ounce, is nearly or quite as effective as the same quantity of oil:

℞. Ol. ricini,	fl. ℥viij.
Glycerini,	fl. ℥ij.
Syr. simplicis,	fl. ℥iij.
Ol. cinnamomi,	♏x.
Ol. menthæ viridis,	fl. ʒss.
Aq. menthæ viridis,	fl. ʒiij.

To make Oi of emulsion. The stock bottle containing it should be kept in a cool cellar, but the amount required for dispensing will keep well in the store.—Trans. Penn. Pharm. Assoc., in New Rem., November, 1880, p. 349.

Emulsion of Tar.—Dr. Girard considers emulsions to be the best preparations of tar for either external or internal use. Tar water is too liable to alterations. Solutions made with the aid of alkalies are for some purposes objectionable. With the aid of saponin, from soap-bark, Mr. Lebœuf is able to make an emulsion that is recommended by him as containing the active ingredients. In using the tincture of soap-bark for this purpose, the saponin introduced is insufficient to produce toxic effect. Such an emulsion is not difficult to take, and is comparatively easy of digestion.—From Med. Times, and Le Prog. Méd., in New Rem., April, 1881, p. 120.

Cod-liver Oil Mixture.—Mr. R. F. Fairthorne finds that the addition of fʒij of tomato or walnut catsup to each ounce of cod-liver oil, will often make the latter palatable when in other admixture it cannot be taken. Another good mixture is the following: Dissolve ½ ounce of Liebig's extract of beef in 2 fluid ounces of water, add 1 fluid ounce of vinegar, and 5 fluid ounces of cod-liver oil, shake well together, and add ½ fluid drachm culinary extract of celery.—Am. Jour. Phar., March, 1881, p. 98.

Tasteless Cod-liver Oil Mixture.—Dr. Penteves recommends mixing a tablespoonful of cod-liver oil intimately with the yolk of one egg, adding a few drops of essence of peppermint, and half a tumbler of sugared water. By this means the taste and the characteristic odor of the oil is entirely covered, and the patients take it without the slightest repugnance.—Drug. Circ., November, 1880, p. 196, from La France Médicale.

Ferrated Cod-liver Oil—Preparation.—Strohmeyer has tried Bernbeck's method (see "Proceedings," 1876, p. 87) for preparing ferrated cod-liver oil, but finds the method unsatisfactory. Bernbeck uses for this purpose an oleate of ferrous oxide, to which he attributes the unsatisfactory character of the process as well as the preparation. Strohmeyer prepares instead an oleate of the ferric oxide and obtains satisfactory results, as follows: 20 grams olive-oil soap, in powder, are dissolved in 800 grams of warm distilled water, and solution of ferric chloride is added as long as a precipitate forms, 7.5 grams being required. The red-brown tough precipitate is then washed with small quantities of hot water, by stirring in a porcelain capsule, until the washings only become slightly opalescent on the addition of nitrate of silver. The ferric soap is then dried by prolonged heat on a water-bath, and will weigh about 18 grams; 16 grams of this ferric soap (containing 1 gram of metallic iron), are now gently heated with 84 grams of cod-liver oil, until solution is effected. A perfectly clear reddish colored product thus results. A necessary condition is that the ferric soap is completely dehydrated; otherwise the solution is not clear and forms a deposit on standing.—Arch. d. Phar., May, 1881, p. 346.

Iodo-ferrated Cod-liver Oil—Preparation.—S. Draisma von Valkenburg, being invited by the Rotterdam department of the Dutch Pharmaceutical Society to make the manner in which he prepares his "iodine-iron cod-liver oil" public, presents the following prescription:

℞.	Iodii,	1.25 parts.
	Ferri pulverati,	2 50 "
	Ol. jecor. aselli,	98.50 "

The iodine is thrown into a vessel filled with cod-liver oil, and by constant stirring or shaking for some days, dissolved. The liquid is now transferred to a vessel containing the iron, the vessel is hermetically shut, and the contents are shaken for some hours, until the liquid assumes a purple-violet color and has but the power to produce the reaction of free iodine when shaken with solution of iodide of potassium and diluted starch. The liquid is now allowed to stand quietly for twenty-four hours, the vessel being carefully shut and nearly full, then shaken again for an hour at least, and, after again determining the absence of free iodine, allowed to stand, so that it may clarify. The oil is then decanted into bottles of yellow glass (of such capacity that the contents may be consumed in five days), filled to the top, and securely corked. It should have a purple-violet color, and a specific gravity of 0.937–0.940 at 8° to 13° C.—Pharm. Jour. and Trans., September 11th, 1880, p. 209.

Cod-liver Oil with Iodoform.—Fonsagrives recommends dissolving 0.25 gram of iodoform in 100 grams of cod-liver oil and adding 10 drops of oil of anise. The dose is a tablespoonful three times a day. The oil of anise improves the odor and taste of cod-liver oil.—Am. Jour. Pharm., December, 1880, p. 601; from Pharm. Zeitschr. f. Russl., 1880, p. 562.

Musk Mixture.—L. Virlogeux recommends triturating musk with an equal weight of sugar into an impalpable powder, which is passed through a very fine sieve, and may be preserved for a long time without deteriorating. For 1 gram of musk 2 grams of this powder are weighed out, mixed with 5 centigrams of powdered tragacanth, and the mixture is rapidly emulsionized by adding in small portions the requisite quantity of syrup and water. Thus prepared, the mixture contains the musk in a state of very fine division.—Am. Jour. Pharm., December, 1880, p. 600; from Rép. de Pharm., 1880, p. 389.

Mixture of Gentian and Iron (Meigs's).—Mr. R. F. Fairthorne gives the following formula for a mixture of gentian and iron, as ordered by Dr. J. F. Meigs, of Philadelphia:

℞.	Ferri et ammonii citratis,	ʒj.
	Extr. gentianæ fluid.,	fʒss.
	Spir. lavand. comp.,	f℥j.
	Spir. vini rectif.,	f℥ss.
	Sacchar. alb.,	℥iss.
	Aquæ,	q. s. ut. ft. f℥viij.

Mix the fluid extract with 1 ounce of water, and add the compound spirit of lavender; treat this with the hydrated oxide of iron, and, having filtered it, mix with the other ingredients, and again filter.—Am. Jour. Pharm., May, 1881, p. 244.

Oxysulphuret of Iron and Magnesia Mixture—Antidote to Cyanides and Metallic Poisons.—Mr. A. F. W. Nietsch draws attention to this mixture, originally recommended by Duflos, as an antidote not only to all metallic poisons, but also to cyanides with which ferrocyanide of magnesium is produced. The mixture itself does not keep well; hence Mr. Nietsch recommends the preparation, extemporaneously, from—

1. Magma of hydrated sulphuret of iron.
2. Milk of magnesia.
3. Granulated sulphate of iron.

The magma of hydrated sulphuret of iron is prepared as follows: 6 parts of liquor ammoniæ, sp. gr. 0.960, are saturated with sulphuretted hydrogen; 4 parts of the same liquor ammoniæ are added, and the whole is diluted with six times its quantity of distilled water. To this mixture, contained in a capacious flask, 8 parts of crystallized ferrous sulphate, dissolved in water, are added. and the vessel is filled with previously boiled water. The precipitate is washed by decantation, and finally preserved in a moist state in well-stoppered vials.

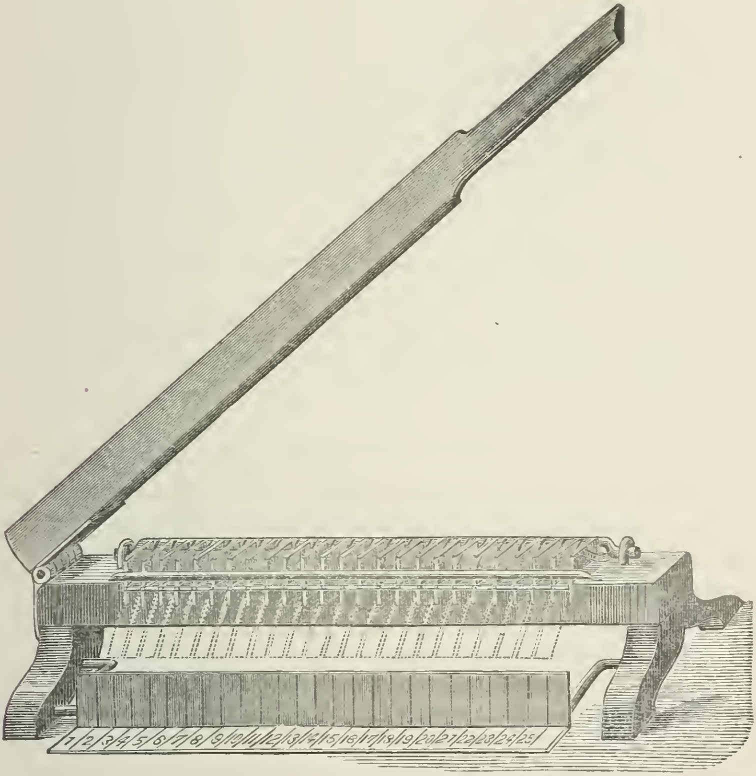
The milk of magnesia is made by triturating 2 parts of calcined magnesia with well-boiled, or distilled water, and preserved in well-stoppered vials.

The antidote is made by triturating the above quantities of hydrated sulphuret of iron and of milk of magnesia with 6 parts of granulated sulphate of iron.—D.-A. Apothek. Zeitg., September 15th, 1880, p. 2.

PILULÆ.

Pill Mass Divider.—Mr. Addison White has constructed an apparatus for dividing pill masses, which was exhibited at a pharmaceutical meeting of the Philadelphia College of Pharmacy, and merits some attention. The machine (see Fig. 35) consists of a walnut base, into the upper surface of which twenty-five narrow brass strips are driven to the depth of one-fourth of an inch, about three-eighths of an inch apart. A lever is hinged to the base, and attached to the side is a graduated bar, the graduations corresponding to the spaces between the brass strips. On the other side of the base a brass-rod, armed with twenty-five movable brass tongues, is adjusted, so that when these are not in use they lie flat upon the base out of the way. To use the divider the pill mass is rolled out in the usual way into a cylinder and laid upon the graduated bar resting upon the table. The bar is now elevated and the cylinder is deposited upon the raised cutters, the lever is brought down which divides the cylindrical pill mass, forcing it into the spaces; the bar carrying the tongues is now raised and the divided pill mass is quickly deposited upon the graduated bar, the whole operation taking much less time than to describe it.—Am. Jour. Phar., December, 1880, p. 633.

Fig. 35.



Addison White's Pill Divider.

Pill-coating.—Mr. W. B. Thompson makes some timely remarks on the subject of pill-coating at the dispensing counter. The desideratum to be sought is a coating, at all times ready, possessing such quick solubility, tenacity, and rapidly drying property as shall at once adapt it to a want which is manifestly needed, and which once attained will quickly revolutionize at least one branch of the dispensing business. A careful scrutiny of the pharmaceutical literature upon the subject of a material for a coating of pills, seems to point upon some form of gelatin as being best adapted for the purpose. So long as fashion demands a coating upon pills let it be of the least objectionable character, and let such coating be applied extemporaneously, and let the material to be thus enveloped be likewise prepared extemporaneously.—Am. Jour. Phar., October, 1880, p. 497.

Cacao Butter as a Coating for Pills.—M. Ditten, apothecary at Christiania, Norway, recommends cacao butter as a coating for pills, and proceeds as follows: A small quantity of cacao butter is melted in a very flat capsule, if possible one with entirely flat bottom, the pills are quickly rolled in it, then at once thrown into a sufficient quantity of powdered starch, and allowed to cool. They will be found coated with a completely isolating, air-tight layer, which protects the mass from all influences of air and moisture, and prevents evaporation of volatile ingredients. The coating keeps well, is almost tasteless, and possesses to a certain degree the agreeable aroma of chocolate.—Pharm. Zeitschr. f. Russl. from J. de Pharm, in New Rem., February, 1881, p. 55.

Soluble Compressed Pellets for Hypodermic Medication.—Dr. L. Wolff recommends compressed pellets of morphia for hypodermic medication as more convenient than powders for the same purpose. They are made to contain each, besides the desired quantity of morphia (say one-fourth grain), one-fourth grain chloride of sodium, and are made by simple compression in a pill-press (made on the plan described by Professor Remington), observing not to compress with too much force, so that solutions may be rapidly obtained. When used, they should be first moistened with one drop of water out of a filled syringe, then broken up with the blunt point of the syringe, all the water added, then sucked up and forced out of the syringe two or three times, until the solution is complete, which may be often accomplished in twenty-two seconds. The solutions so produced give less pain than the ordinary solutions of either morphia salts alone or with their antiseptic admixtures. There is no reason why this form for hypodermic remedies may not be extended to other remedial substances.—Am. Jour. Phar., December, 1880, p. 593.

Pilul. Hydrargyri—Modification of Officinal Process.—Professor J. P. Remington draws attention to the following formula, which is recommended for adoption in the new edition of the U. S. Pharm.:

Triturate 8 parts of licorice root, in fine powder, with 16 parts of mercury and 3 parts of honey; gradually add 4 parts of rose-water, and continue the trituration until the globules of mercury cease to be visible under a lens magnifying ten diameters. Then add 15 parts of sugar and 2 parts of red-rose, in fine powder, and rub the whole thoroughly together until a uniform plastic mass results. If the mass becomes too dry during trituration, add a little distilled water, and when the whole is thoroughly mixed expose the mass to the air in a thin layer until it is of proper consistence.—Am. Jour. Phar., April, 1881, p. 192.

Pills of Protochloride of Iron—Preparation.—Mr. Wm. Gilmour recommends the following process for making pills of protochloride of iron: Take of iron wire (cleaned and cut small), 130 grains; hydrochloric acid (B. P.), 516 grains; water, 2 fluid ounces. Put into a small flask and heat until effervescence ceases; filter while hot into an evaporating-dish, and quickly evaporate until, on stirring with a glass rod, the whole crystallizes, when it should be at once incorporated with the following mixture: Sugar, finely powdered, 200 grains; licorice powder, 200 grains; tragacanth powder, 20 grains. The mass is divided into 144 pills. Each pill will contain, as near as possible, 2 grains of anhydrous chloride, though not in an anhydrous condition, but in a condition intermediate between that state and one containing the full quantity of water represented by the formula $4H_2O$. If, as may be, the mass should be too soft, it may be transferred to an evaporating-dish, and dried with gentle heat to the necessary condition. This must, however, be done with great care to prevent oxidation on the one hand, or charring and consequent oxidation from overheating on the other. They should, if rolled warm, be firm and solid when cooled. The author has experienced some difficulty in keeping them, inasmuch as they become soft after ten days or a fortnight. So far the best preventive consists in coating them thinly with oleum theobromæ and then rolling them in powder; though this coating is liable to crack after the third or fourth week. He has insufficient experience with balsam of tolu as a coating, but considers it probable that such may be found to answer the purposes of a protective.—Chem. and Drug., June, 1881, p. 251.

PULVERES.

Ferrum Oxydat. Saccharat. Solubile—Improved Process.—The quantity of solution of soda required by the Phar. Germ. is, according to the experience of C. Schneider (as well as Dr. Hager, Hoffmann, and others), too large, and in consequence the syrup becomes dark-brown and of unpleasant taste—due to the formation of glucinic acid and caramel-like substances. Mr. Schneider draws attention to the improved process recommended by Hoffmann in 1874 (see Proceedings, 1875, p. 88), in which only 24 instead of 40 parts of solution of caustic soda are used. The precipitation is effected by pouring the solution formed into boiling distilled water; but this is a slow and tedious process, for which reason O. Ficinius (see Proceedings, 1878, p. 396), recommended the precipitation of the syrupy liquid in thrice its volume of alcohol of 90 per cent. The objection to this, according to Schneider, consists in the difficulty to remove the chloride of sodium completely, and he therefore recommends the following process: In a capacious porcelain capsule mix 10 parts of (neutral) solution of chloride of iron (ferric), of specific gravity 1.480, with a solution of 4.5 parts of sugar, in an equal weight of cold water. Then add, in 4 or 5 portions, a solution of 12 parts of perfectly pure carbonate of sodium in 24 parts of water, and assist the escape of carbonic acid gas by brisk stirring with a glass rod. The resulting homogeneous magma dissolves at once, on the addition of 6 parts of solution of soda, of specific gravity 1.330. The solution is now diluted with 83 parts of distilled water, and poured, under stirring, into a mixture of 83 parts each of alcohol and water. This produces a finely divided, quickly settling precipitate, which is easily washed with diluted alcohol (1:1), and finally with a little distilled water. It yields a light-brown syrup of a pure and agreeable taste.—Arch. d. Pharm. August, 1880, p. 111, and Ph. Zeit., f. Russl., No. 17; New Rem., March, 1881, p. 69.

Compound Powder of Senna.—Dr. E. F. Blackwell finds certain objections to the compound powder of licorice of the German Pharm., and proposes one with greater laxative power under the name of *Pulvis Sennæ Compositus*, as follows: Take senna, washed sulphur, white sugar, of each 8 parts; fennel, licorice, of each 4 parts. All of them should be in fine powder, and then mixed.—Am. Jour. Phar., Feb., 1881, p. 83; New Rem., April, 1881, p. 119; from Med. Times.

Seidlitz Powder—New Formula.—Dr. E. J. Kempf recommends the addition of chloride of ammonium, which is particularly useful in common colds, where a laxative is indicated. The tartrate of sodium and potassium powder is made as usual; but to the tartaric acid powder 5 grains of chloride of ammonium is added. The seidlitz powder is, of course, taken as usual.—Am. Jour. Pharm, April, 1881, p. 181; Drug. Circ., June, 1881, p. 84; from Louisville Med. News.

Antiseptic Powder with Carbolic Acid.—This is prepared by T. Bruno by melting together rosin, 60.0, with stearin, 15.0, and adding to the cooling, but still liquid, mixture, carbolic acid, 25.0. This mixture is then carefully triturated with 800.0 precipitated carbonate of calcium until a uniform powder is obtained.—Am. Jour. Phar., 1881, p. 248; from Pharm. Post, 1881, p. 133.

Powder for Perspiring and Sore Feet.—In the German army the following powder is used: Salicylic acid, 3 parts; starch, 10 parts; talc, 87 parts. To be applied dry, daily, on the march, and every two or three days in garrison.—Chem. and Drug., December, 1880, p. 534.

Salicylated Starch.—This is recommended by Dr. Kersch in eczema, and is prepared by adding pure starch in small portions to a rather large quantity of a 2 or 3 per cent. solution of salicylic acid in alcohol, agitating well after each addition. The excess of liquid is decanted, the starchy mass inclosed in muslin, well pressed, rubbed into powder, and dried at about 80° C. A similar intimate mixture of salicylic acid with starch cannot be prepared by even long-continued trituration of the two substances.—Am. Jour. Phar., May, 1881, p. 248; from Pharm. Post, 1881.

SAPONES.

Soap—Easy Method of Preparation.—Mr. W. J. Menzies gives the following practical recipe, which, if accurately followed, will turn out rapidly, conveniently, and cheaply large quantities of soap. It may be converted into toilet soap by the addition of oil of mirbane, bitter almond oil, oil of citronella, or oil of cloves; bichromate of potash (½ ounce to the quantity of lye below given) will give a green color, 1 pound of palm oil (to the tallow or oil below given) will give a yellow color, and a good brown is produced by burning ½ pound of sugar until black, dissolving it in a pint of water, and adding to the tallow before mixing. If clean fats are used, the soap will be white. The grease or tallow must be free from salt; if not, it must be purified from it by boiling with water. Discolored or rancid grease is just as good as fresh for soap-making purposes.

Take exactly 10 pounds of double-refined 98 per cent. caustic-soda powder (Greenbank), put it in any can or jar with 45 pounds (4½ gallons) of water, stir it once or twice, when it will dissolve immediately and become quite hot; let it stand until the lye thus made is cold. Weigh out and place in any convenient vessel for mixing, exactly 75 pounds of grease, tallow, or oil (*not* mineral oil). If grease or tallow be used, melt it slowly over the fire until it is liquid and *just warm*—say, temperature not over 100° F. If oil be used, no heating is required. Pour the lye slowly into the melted grease or oil in a small stream continuously, at the same time stirring with a flat wooden stirrer about three inches broad; continue gently stirring until the lye and grease are thoroughly combined and in appearance like honey. Do not stir too long, or the mixture will separate again. The time required varies somewhat with the weather and the kind of tallow, grease, or oil used; from fifteen to twenty minutes will be enough. When the mixing is completed, pour off the liquid soap into any old square box for a mould sufficiently large to hold it, previously dampening the sides with water so as to prevent the soap sticking. Wrap up the box well with old blankets, or, better still, put it in a warm place until the next day, when the box will contain a block of 130 pounds of soap, which can afterwards be cut up with a wire. Remember the chief points in the above directions, which must be exactly followed. The lye must be allowed to *cool*. If melted tallow or grease be used, it must not be more than *warm*. The *exact* weights of double-refined 98 per cent. powdered caustic soda and tallow or oil must be taken; also the lye must be stirred into the grease, *not* grease or oil added to the lye.—New Rem., November, 1880, pp. 329–330; from Chem. and Drug., August, 1880.

Mr. Menzies, in a communication to "Druggists' Circular" (February, 1881, p. 29), draws attention to the inferior quality of some of the brands of "concentrated lye" (so called), and warns against their use in carrying out his directions for soap-making by the cold process. With one exception,—the Lewis powdered 98 per cent. lye, put up at Philadelphia,—they are all impure, the best containing 10 and some brands actually 70 per cent. of impurity. The so-called rock potash, or ball potash, sold in the United States, *without exception*, not only is *not* potash, but is composed exclusively of soda. Of course, with such an article, *potash* soap, by the author's method, cannot be made. He recommends for his cold process the new double-refined 98 per cent. powdered caustic soda and pure caustic potash put up by the Greenbank Alkali Company, in ten- and twenty-pound packages. With these it is possible to make good soap more cheaply than they can be bought under the most favorable conditions.

Soap—Preparation by Cold Process.—Mr. R. F. Fairthorne states that a good hard soap can be easily produced if 4 pounds of olive or sweet almond oil are mixed with 2 pounds of soda lye, of the strength 36° Beaumé, and stirred until of the consistence of thick paste, when it should be poured into moulds, covered by several folds of muslin, and kept in a warm room for twenty hours. By this treatment the process of saponification is complete. When the materials are first mixed, the temperature of the mass rises, and this favors the saponification; hence, also, the necessity of covering the moulds and keeping them in a warm room. Slightly rancid oils are desirable, and when they are free from rancidity, 10 per cent. of rancid oil should be added, else two or three days are required to effect the same end. The soap produced, after a few days, is as hard and dry as that article generally is when made in the usual manner.—Am. Jour. Pharm., November, 1880, p. 540.

SPIRITUS.

Spiritus Ætheris Nitrosi—Percentage of Nitrous Ether in Commercial Samples.—The experience of Mr. E. Kellström shows that this spirit is as liable to vary in Sweden as in other countries. Three samples obtained from drug stores in Stockholm yielded 0.2, 0.3, and 2.5 per cent. respectively, while another, prepared in the Pharmaceutical Institute contained 3.0 per cent.—From Farmac. Tijdschrift, and Pharm. Ztg., in New Rem., April, 1881, p. 117.

Spir. Ætheris Nitrosi—Development of Hydrocyanic Acid during its Distillation.—The poisonous character of the vapors of spiritus æther. nit., during its manufacture on the large scale, and the presence in it of *hydrocyanic* acid has first been demonstrated by Simon and afterwards by Gaultier de Claubry and Dalpiaz, while Tenard was unable to find it. Dr. I. J. K. W. Schoor and G. B. Schmidt have now again examined the subject. They prepared the spirit very carefully, according to the "Pharm. Neerland." from 700 gm. of alcohol and 150 gm. of nitric (free from hydrochloric) acid, and used for neutralization pure soda. On examining the product and residue, hydrocyanic acid was found in the latter, in which nitrate of silver produced a copious precipitate of cyanide of silver, and its identity was further established by the production of Prussian blue and the sulphocyanide of iron reaction. Altogether, the residue contained 0 97 per cent. of hydrocyanic acid. The distillate yielded only a faint cloudiness with nitrate of silver, and on being rectified, the remaining residue was found free from hydrocyanic acid.

A lot of spir. æth. nit. which was shown to be entirely free from this impurity, immediately after distillation, was left standing for a few months in half-filled bottles when it gave a distinct test for hydrocyanic acid, the quantity of the latter being found to be 0.004 per cent. In another lot similarly treated this impurity did not develop, although it had turned acid.—Pharm. Zeit., No. 37.

In No. 41 of the same journal, Th. Salzer suggests that the presence of the hydrocyanic acid may have been caused by some impurity of the nitric acid. He thinks it not impossible that, during the action of nitric acid upon the alcohol, a little acetic and traces of formic acid may be produced, which latter would form a salt with the small quantity of ammonia, found by the author to exist most commonly in crude as well as in pure nitric acid.—New Rem., September, 1880, p. 277.

Spirit. Ætheris Nitrosi—Test for Water.—Mr. J. U. Lloyd gives the following simple tests for the presence of water in spirits of nitrous ether: Shake the sample with its bulk of chloroform or castor oil; if free from water a clear mixture is obtained in either case. If watery, milky mixtures are produced which separate in two layers on standing.—Drug. Circ., June, 1881, p. 81.

Spirit of Chloroform—Variability as Dispensed in England.—Mr. J. C. Thresh had sent a letter to about one hundred chemists, including the heads of most of the best-known dispensing establishments, asking them what they were in the habit of dispensing and retailing when chloric ether (ether chlor. or sp. eth. chlor.) are prescribed or asked for. The replies showed that twenty-seven firms used sp. chlorof. (B. P.), eleven used Duncan's chloric ether only, fourteen used a solution of chloroform in alcohol stronger than the B. P.; six others who replied used special products of their own. Samples were also obtained from manufacturers or large wholesale houses, with three from retail houses. Among twenty samples so collected were Duncan's preparation; "special distilled products," sp. chloroform, B. P., and sp. chloroform of greater strength. The "distilled" chloric ether generally contained a small percentage of chloroform. The samples varied in percentage of chloroform from 2 to 12½ per cent., and in specific gravity from 0.861 to 0.922. In like manner Mr. Thresh obtained information and samples of—

Spirit. Ammoniæ Comp. (*sal volatile*).—Forty-four chemists employ the officinal spirit; six use sp. ammon. co., "P. L., 1836," and six use the preparation of special makers when "sal volatile" (sp. ammon. co.) is called for. As regards the manufacture, with perhaps one exception, every wholesale house made a sp. ammon. co., besides the B. P. sp. ammon. aromat. His examination of the samples sent him proved that the special preparations varied in specific gravity from 0.840 to 0.954, and the percentage of ammonia from 0.813 to 2.326. The official preparation also varied from 0.865 to 0.894 specific gravity, and from 1.067 to 2.849 per cent. of ammonia. It was, furthermore, found that there was no ratio whatever as to the proportion of ammonia present in the free form, or as carbonate.—Chem. and Drug., September, 1880, p. 389; from Proc. Brit., Phar. Conf., 1880.

Spiritus Formicarum, Ph. Germ.—*Acidity.*—Dr. Hager ("Pharm. Praxis," I. 1102) states that the spir. form. of the Pharm. Germ. contains about 10 per cent. of formic acid. According to Dr. F. Gerhard, this is an error. Three samples prepared by him in strict accordance with the German Pharmacopœia, contained respectively 0.73, 0.76, and 0.82 per cent. of formic acid. When subjected to the test of the Pharm. Germ., they conformed in every respect. The author draws attention to this because Dr. Hager gives in his "Pharm. Praxis" formulas for spir. formic. and tinct. formic., which are evidently based on a strength of 10 and 15 per cent. of formic acid respectively, while they should really contain 1 and 1.5 per cent. respectively.—Phar. Centralh., July 8th, 1880, p. 235.

Compound Spirit of Cinnamon.—Mr. Allen Shryock mentions that, having a prescription in which compound spirit of cinnamon was directed as a component, he dispensed as such compound spirit of lavender to which oil of cinnamon had been added in proportion of ♏ij to f℥ss. Professor Maisch, referring to this, draws attention to a compound spirit of cinnamon which is still in use in France, and designated

Alcoolat de Cannelle Composé, known also as "esprit de vie de Matthiole." Its formula is as follows: Take of cinnamon 30 parts; galangal, marjoram, mint, cubeb, aloe wood. ginger, zedoary, clove, nutmeg, and mace, of each, 15 parts; calamus, thyme, wild thyme, sage, rosemary, red rose, of each, 8 parts; yellow santal-wood, cardamom, anise, fennel, of each, 4 parts; lemon-peel, 45 parts; 80 per cent. alcohol, 3000 parts. After sufficient maceration, the mixture is distilled until all the spirit has been recovered.—Am. Jour. Pharm., April, 1881, p. 152.

SYRUPI.

Syrups—Preparation by Percolation.—Mr. Samuel W. Gadd has made experiments with this process, and finds that, with the exception of the syrups of iodide of iron and of acacia, all the officinal syrups are with advantage made by percolation. In his experience, a funnel, the angle of which is about fifty-five degrees, is preferable to a cylindrical percolator. The funnel should have a wide neck, which is best stopped with sponge. The first portion of syrup passing is to be returned. The author has obtained a very satisfactory

Syrup of Ipecacuanha as follows: Take of fluid extract of ipecacuanha, f℥ij; add to it f℥vj of water; shake and allow to stand for a day, filter, and wash the filter with sufficient water to make f℥xij filtrate. With this percolate through ℥xxj granulated sugar, and add to the syrup so obtained sufficient syrup to make 2 pints. The precipitate from a fluid ounce of fluid extract was taken by the author with a view to determining whether, as stated by some, it retained some emetine after the treatment recommended. He did not experience any uncomfortable result, and hence infers that all the emetine is extracted therefrom.—Am. Jour. Pharm., December, 1880, p. 596.

Mr. G. H. Chas. Klie also relates his experience with the process of percolation applied to the preparation of syrups, and gives some interesting hints in this connection. He favors the process for all the officinal syrups, as well as for the *fruit syrups*. If the juices from which the latter are prepared have been completely fermented before making the syrup, the latter will keep unchanged for years.—Am. Jour. Pharm., January, 1881, ap. 1–6.

Syrupus Ipecacuanhæ—Preparation.—The following, according to E. J. Lawall, will yield a syrup which keeps unchanged for more than a year: Moisten 2 ounces of ipecacuanha, in moderately fine powder, with alcohol and pack firmly in a percolator; pour upon it 2 fluid ounces of alcohol, and when this has been absorbed, 8 ounces of a mixture of 2 parts of alcohol and 1 of water; continue the percolation with diluted alcohol until ten fluid ounces of tincture have passed, setting aside the first two ounces so that they may evaporate spontaneously to a syrupy consistence. Mix one fluid drachm of acetic acid with the remainder of the percolate. Evaporate to 2½ ounces, and mix this and the reserved portion with 10 ounces of water, continuing the evaporation to 14 ounces. When cool, filter, pass sufficient water through the filter to make 14 fluid ounces of filtrate, in which dissolve 18 troy ounces of sugar by agitation; then add 4 fluid ounces of glycerin and sufficient simple syrup to make the whole measure 32 fluid ounces.—Am. Jour. Pharm., May, 1881, pp. 246, 317.

Syrup of Citric Acid—Improved Process of Preparation.—Mr. J. B. Moore, as the result of experience and experiments, offers the following improved method for the preparation of syrup of citric acid: Add 10 to 15 minims of oil of lemon to 8 ounces of boiling water contained in a quart bottle, shake vigorously; add 9 troy ounces of sugar, and shake occasionally until the mixture cools. Then add 4 grains of finely powdered carbonate of magnesium, again shake, and filter through paper, passing sufficient water through the filter to make the filtrate measure 14 fluid ounces; to this add 6 troy ounces of sugar and 68 grains of citric acid in powder, shake until dissolved, and strain if necessary. Solution may be aided by setting the bottle in water heated to 140° or 150°. The syrup keeps better than the officinal one, and is, in the author's opinion, in every way a better preparation. It should be kept in a *cool dark* place.—Drug. Circ., October, 1880, p. 182.

Syrup of Orange Peel.—If two ounces of tincture of sweet orange peel, prepared in the same manner and of the same strength as the officinal tincture of bitter orange peel, are mixed with 14 fluid ounces of simple syrup, a syrup is formed, which, according to Mr. R. F. Fairthorne, is equally pleasant in taste and appearance to that made by the formula of the Pharmacopœia.—Am. Jour. Phar., November, 1880, p. 541.

Syrup of Tolu, Ginger, etc.—Rapid Preparation.—Mr. Thomas S. McElhenie has found the following a rapid process for preparing certain syrups when in a hurry: Agitate the tincture (or essential oil) with a little precipitated chalk, then with the proper quantity of water, heated to near boiling, in a suitable bottle, for a few minutes; throw upon a filter placed in a bottle containing the sugar. The hot solution filters rapidly, and a few minutes' shaking completes the syrup, which may be readily strained through a small sponge in the neck of a funnel. The same idea will serve in making medicated waters when time presses.—Am. Jour. Phar., January, 1881, p. 19.

Syrupus Liquiritiæ, Phar. Germ.—Modification of Manipulation.—"P. G." recommends the process of the Phar. Germ. for syrup of licorice, but finds the difficulty of filtering the infusion of licorice an objection. Proceeding, therefore, as directed by that Pharmacopœia in all other respects, instead of concentrating the infusion to 7 parts, he evaporates to the consistence of extract, allows this to cool, and then adds cold water to make 7 parts. The solution is decanted from the sediment, and now filters readily.—D.-A. Apothek. Ztg., October 15, 1880, p. 5.

Syrup of Chocolate—Preparation for Soda Water.—Mr. E. W. Hurd recommends the following formula and process: Baker's chocolate (plain), 4 ounces; boiling water, 4 ounces; water, 28 ounces; sugar, 30 ounces; extract of vanilla, ½ ounce. Cut the chocolate into small pieces, then add the boiling water, and stir briskly until the mixture forms into a thick paste and assumes a smooth uniform appearance. Then slowly add the remainder of the water, stirring at the same time, and set aside until cold. After cooling thoroughly, a layer of solid grease forms over the surface, which is to be carefully removed by skimming; then add the sugar, dissolve by aid of a gentle heat, and allow the whole to come to a boil. Then strain and add the extract of vanilla. The author states that this forms a perfect syrup, which possesses the pure rich flavor of the chocolate without the unpleasant taste of the fat.—Drug. Circ., June, 1881, p. 83.

Syrup. Violar. Odorat.—Improved Process.—C. Bernbeck recommends the following process, which furnishes a beautiful violet-blue syrup of characteristic odor: 100 grams of the fresh flowers, deprived of their calyx, are reduced to pulp in a mortar, 50 grams of alcohol being gradually added, and the whole is allowed to macerate for six to eight hours in a glass or porcelain vessel, then pressed. The residue is treated with water and again expressed, so that the total expressed liquid will weigh 100 grams. This is filtered, and may be at once added to nine times its weight of thick sugar syrup (sp. gr. 1.36), or preserved in small vials, which must be corked air-tight.—Phar. Centralh., March 31, 1881, p. 144.

Syrupus Pilocarpi.—The following formula is given in the "Phar. Zeitung" (1881, p. 208): 100 grams jaborandi leaves are macerated in the same quantity of alcohol for three hours; sufficient boiling water is then added to obtain 1000 grams of infusion, in which 1800 grams of sugar are dissolved.—Am. Jour. Phar., May, 1881, p. 251.

Syrupus Guaiaci—Improved Formula.—In the March number of the "Am. Jour. Pharm.," 1876 (p. 139), a formula for syrup of guaiacum is given, which, in the experience of Dr. T. C. Craig, is defective, inasmuch as the quantity of potassa (f℥ss. of the officinal solution) to the guaiacum (℈xxxij) is insufficient to dissolve the acid resins of the drug. Upon the basis of calculation made, the author now suggests the following improved formula :

Take of

Powdered guaiac. resin,	℈xxxij.
Potassic hydrate,	lviij grs.
Sugar,	1 lb. avoird.
Water,	q. s.

Dissolve the potassic hydrate in 8 fluid ounces of water ; moisten the guaiacum with this solution ; pack it in a percolator and gradually pour on the balance of the solution ; when this ceases dropping add sufficient water to make the percolate measure 8 fluid ounces ; add the sugar, and dissolve. The author calculates that in this preparation all of the guaiaconic and guaiaretic acids, amounting to 80 per cent. of the drug, will be represented.—Am. Jour. Phar., July, 1880, p. 345.

Syrups of Pine-buds—Preparation.—Müller proposes to use a syrup of pine-buds which contains all the active constituents, and has an agreeable taste. It may be made either vinous or aqueous, as follows :

Vinous Syrup of Pine-buds.—Infuse 50 parts of pine-buds in sufficient hot white wine, so that when the liquid is strained there shall be 600 parts of filtrate ; in which dissolve 900 parts of sugar.

Aqueous Syrup of Pine-buds.—Infuse 80 parts of pine-buds in sufficient boiling water, add 5 parts of carbonate of potassium, and let the whole stand for twelve hours; strain the liquid, which must weigh 600 parts, and dissolve in the filtrate 900 parts of sugar.

Both the infusion and tincture of pine-buds have hitherto been used in Europe as an efficient diuretic and so-called "blood purifier."—New Rem., August, 1880, p. 246; from Schweiz. Wochenschr. f. Pharm.

Syrup of Iodide of Iron—Prevention of Discoloration.—Mr. Thos. B. Groves, after referring to the cause of the discoloration of this syrup, the methods that have been proposed for its prevention and removal, etc., draws attention to a former paper ("Pharm. Jour.," (2) vol. 9), in which he had pointed out the effect produced by the presence in the syrup of a trace of phosphoric acid, how that by seizing at the moment of its formation the peroxide of iron and rendering it insoluble, it effectually prevented the reaction ending in the elimination of free iodine that would otherwise have resulted. Syrup, even dilute, will keep for years after being thus treated, but of course one gets instead of the discoloration the slight turbidity occasioned by the deposit of perphosphate of iron ; this, however, being colorless and easily removed by deposit or filtration, is of no consequence. Addition of phosphoric acid to syrup already discolored is of no avail. If, however, a few drops of liquor potassa be added, and then a slight excess of phosphoric acid, the color disappears and will not again return.—Drug. Circ., November, 1880, p. 197 ; from Proc. Brit. Pharm. Conference, in Phar. Jour. Trans.

Syr. Ferri Iod.—Preservation.—Dr. E. Mylius recommends exposure to direct sunlight as a preservative, and explains the decomposition (coloration) and restoration (discoloration) of syrup of iodide of iron as follows: By the action of oxygen and water upon ferrous iodide a basic ferric iodide would be formed, if, analogous to the compound of chlorine and iron, such a compound existed. As it is, the decomposition is in accordance with the following formula:

$$2(FeI_2) + O_3 + (H_2O)_3 = Fe_2 (OH)_6 + I_4.$$

Iodine and ferric oxyhydrate are thus liberated, the former giving the brown color observed. According to the former view, still held by some, this free iodine was removed by the addition of metallic iron; but the presence of this is not at all necessary, the original quantity of iron being sufficient for all purposes. For, by the action of the sunlight, the sugar reduces the oxyhydrates, and the free iodine again combines to form ferrous iodide, according to the following formula:

$$Fe_2(OH)_6 + I_4 + H_6 = (FeI_2)_2 + (H_2O)_6.$$

The H_6 is derived from the sugar, which thus probably forms a small quantity of free acid (probably gluconic).—Phar. Centralh., March 31st, 1881, p. 137.

Syrup and Solution of Iodide of Iron—Preservation.—Mr. P. Carles reviews the several methods which have been proposed for the preservation of solution of iodide of iron. He considered that what was wanted was a body of the same nature as the ferrous salt—insoluble, and with greater attraction for oxygen than the iodide itself, for without free oxygen there can be no decomposition of the iodide.

This body he has found in *hydrated sulphide of iron.* The addition of a few centigrams of this salt to a solution of iodide of iron will preserve it indefinitely. Mr. Carles has some samples made in March, 1878, as colorless and perfect as on the day they were made. Further, the addition of some of the same sulphide to a discolored solution, after agitation, restored the liquor and removed the discoloration.

The sulphide is completely insoluble, and in reducing the yellow ferrous solutions, an equally insoluble oxyiodide of iron is formed. Consequently, no foreign substance can be added to the solution. The sulphide is prepared by precipitating a solution of iron by sulphide of ammonium. Wash the precipitate by decantation several times in boiling water, collect on a filter, and preserve in a well-stopped bottle in a moist condition.

Mr. Carles prepares the solution thus:

Iron-filings, fine and unoxidized,	8 gm.
Distilled water,	95 "
Iodine,	27 "

Add the iodine gradually, and when the solution has become colorless, filter to remove the excess of iron and carbon, which the metal always contains. Then introduce about two grams of the paste of sulphide of iron.

The syrup is liable to decomposition, on account of the alkaline salts sometimes contained in the sugar, or in the water with which it is made. These may be counteracted, and the taste of the syrup, if anything, improved by the addition of one gram of citric acid in 1300 grams of syrup.—New Rem., May, 1881, p. 151; from Bull. de la Soc. de Pharm. de Bordeaux, and Chem. and Drug.

Syrup of Protochloride of Iron—Preparation.—Mr. William Gilmour recommends the following process for the preparation of this syrup:

Take of

Iron wire (cleaned and cut small),	70 grains.
Hydrochloric acid (B. P.),	288 grains.
Water,	1½ ounce.

Put the ingredients into a small flask and heat gently until effervescence ceases; then boil for a few minutes, and filter while hot into sufficient thick simple syrup to make the whole measure 10 fluid ozs. This syrup, each fluid drachm of which contains as near as possible 2 grains anhydrous ferrous chloride, keeps well, as determined by exposure to various conditions.—Chem. and Drug., June, 1881, p. 251.

TINCTURÆ.

Tinctures by Maceration and Digestion.—Mr. Dietrich has experimented to determine the respective values of maceration and digestion in the preparation of tinctures. A number of substances were selected and equal quantities were subjected to maceration and to digestion, while a third series of experiments was made by first digesting and then macerating for eight days. The specific gravity of the tincture was then taken, when it was found that the difference was very immaterial. Mr. Dietrich, therefore, recommends maceration of the coarsely powdered drug in glass bottles, closed with a good cork instead of bladder as now recommended.—Schweiz. Wochensch. f. Phar., September 3d, 1880, p. 322.

Dialyzed Tinctures—Preparation and Comparative Strength.—Mr. Charles F. Heebner has prepared tinctures of aconite, nux vomica, opium, and belladonna, by the officinal method and by a process of dialysis, and finds those made by the latter process to be fully as strong in alkaloidal constituents as those made by the usual method. The method of dialysis consists in making a magma of the proper quantity of drug with a menstruum containing 25 per cent. of alcohol, placing this on parchment, and subjecting it to the action of an appropriate quantity of the same menstruum for one week. The author gives details and analytical data, which were to support his conclusions.—New Rem., May, 1881, p. 132.

Tincture of Kino—Modified Formula and Process.—Mr. J. B. Moore has for several years adopted a modification of the officinal formula which furnishes, in his opinion, a much better preparation: 1½ troy ounce of kino, in powder No. 80, and 8 ounces of boiling water, gradually added, are triturated together, until a smooth uniform mixture is obtained, to which 4 fluid ounces of stronger alcohol are added. The whole is well mixed, and strained through muslin; the muslin strainer, with contents, is placed in a glass funnel, and water with sufficient of a mixture of 1 part of stronger alcohol and 2 parts of water to make with the strained portion 12 fluid ounces. Finally add 4 fluid ounces of glycerin. After standing a few days, the clear tincture may be decanted from a little sediment that forms; or the tincture may at once be filtered, but this is tedious. Tincture of kino so made has never changed during an experience of five or six years, and has at times been kept as long as a year. The author also regards its weak alcoholic strength an advantage on therapeutic grounds.—Drug. Circ., April, 1881, p. 51.

Tincture of Opium—Improved Process of Preparation.—Mr. J. B. Moore recommends the following improved process for preparing tincture of opium: Pour 70 fluid ounces of boiling water on 8 troy ounces of powdered opium in a suitable vessel, digest the mixture with frequent stirring for one hour at a temperature of 170° to 190°. Then immediately transfer the mixture to a close vessel, add to it 58 fluid ounces of stronger alcohol, and macerate with occasional shaking until the mixture cools. Strain off the liquid, and, after subjecting the residue to *strong* expression, rub the residue between the hands until reduced to a uniform condition; pack into a glass funnel, prepared for percolation, not too firmly, and percolate with the strained and expressed liquid, followed by sufficient water to make 8 pints of percolate. If prepared from undried opium, a proper allowance must be made for the moisture; the digestion, also, must be continued until the opium is completely softened, after which it is worked and malaxated between the hands until thoroughly disintegrated, and the digestion resumed. —Drug. Circ., December, 1880, p. 213.

Tinctura Opii Simplex—Phar. Germ.—Dr. E. Mylins, after numerous experiments, has satisfied himself that there is no necessity to digest the opium in the diluted alcohol at 30°–40°, or to employ it in the condition of fine powder when making the tincture of the Phar. Germ. It suffices to slice the opium (using, of course, the increased quantity indicated by the amount of moisture), and to macerate it at the ordinary temperature. To secure a uniform product the morphine should be determined; and for this purpose his recently recommended colorimetric method (see opium) works excellently.—Phar. Centralb., March 17, 1881, p. 115.

Camphorated Tincture of Opium.—Mr. J. B. Moore proposes to make this as follows: Pour 70 fluid ounces of boiling water upon ½ troy ounce of powdered opium. digest the mixture with frequent stirring for half an hour, at a temperature of 170° to 190° F. Then transfer the mixture at once to a suitable bottle, add 58 fluid ounces of stronger alcohol and sufficient water to make the liquid measure 8 pints. Then dissolve 160 grains of camphor in 4 fluid drachms of oil of anise in a mortar, add ½ troy ounce of benzoic acid, triturated well, and add 8 troy ounces of clarified honey. When well mixed add to the 8 pints of liquid in the bottle, shake vigorously, and filter through paper.—Drug. Circ., March, 1881, p. 33.

Mr. Matt. W. Borland offers the following formula for camphorated tincture of opium, which does not deviate materially from the officinal tincture, and which will mix with water without turning milky: Powdered opium, benzoic acid, each 60 grains; camphor, 40 grains; clarified honey, 2 troy ounces; *freshly powdered anise seed*, 1 troy ounce; diluted alcohol, 2 pints. Macerate twenty-four hours and filter.—The Pharm., April, 1881, p. 125.

Tincture of Rhubarb, U. S. P.—Cause of Precipitation and Prevention.—W. P. Clarke believes that the precipitation of chrysophanic acid in tincture of rhubarb will not occur if the tincture is made primarily with strong alcohol and then diluted with water. The resinous deposit formed he regards as of no consequence. He attributes the precipitation of the chrysophanic acid to the presence of inert substances (the author mentions "starch" and pectic acid) taken up by the diluted alcohol, which by his proposed treatment are excluded. The quantity of rhubarb and cardamom for 2 pints of tincture is percolated with sufficient alcohol of 92 per cent. to make 1 pint of strong tincture, to which 1 pint of water is added, and, after standing twenty-four hours, filtered.—Drug. Circ., November, 1880, p. 197, from Proc. Wisconsin Phar. Assoc.

Tinctura Rusci.—In reply to an inquiry, Prof. J. M. Maisch advises that this tincture be made from the rhizome with diluted alcohol in the proportion of 20 to 100 parts. The taste of such a tincture is disagreeable, sweetish, and bitter. It is recommended by Prof. Kaposi, in Hebra's work on skin diseases, for ringworm. While two other species of Ruscus (*R. hypophyllum* and *R. hypoglossum*) have formed medicinal applications, the author is of the opinion that the one meant for the above tincture is *R. aculeatus*, or butcher's broom, which, like the other species, is indigenous to Southern Europe, but is also found in England. The rhizome, known as *radix rusci* or *brusci*, possesses aperient and diuretic properties, and was formerly much used in visceral diseases.—Am. Jour. Ph., January, 1881, p. 33.

In a subsequent paper (Ibid., February, 1881, p. 55), Prof. Maisch remarks that his attention has been drawn to the fact that *tinctura rusci* is not a tincture of the obsolete butcher's broom, but that it is an alcoholic tincture of birch oil, or rather birch tar. In New York the tinctura rusci is said to be made by dissolving 1 part of the tar in 3 or 4 parts of alcohol.—Hager, in "Pharm. Praxis," gives the following formula for—

Essentia Rusci.—Olei rusci, 10 parts; alcoholis, 100 parts. Mix, and, after decantation, filter.

Another formula for the tincture is as follows: Olei rusci, 10 parts; alcoholis, ætheris, each 15 parts; olei lavendulæ, olei rutæ, olei rosmarini, each 0.4 parts. Mix and filter.

Tincture of Stillingia.—J. Dabney Palmer communicates the following formula for tincture of stillingia, which, he observes, is excellent:

Take of

Stillingia root (fresh),	8 ounces.
Diluted alcohol,	2 pints.
Nitric acid,	½ f℥.—M.

Macerate fourteen days; express and filter. The dose is five drops in water, three times daily, gradually increased. The addition of the nitric acid is stated by the author to be of great value in tinctures made by maceration, since it forms soluble nitrates (? Rep.).—Am. Jour. Pharm., 1881, p. 34.

Concentrated Tincture of Tolu.—Mr. J. B. Moore recommends that a concentrated tincture of tolu be made by dissolving 8 troy ounces of balsam of tolu in sufficient stronger alcohol to make 1 pint. A portion of alcohol is placed into the bottle; the neck being dried, a little glycerin is smeared in it to prevent the tolu from sticking when being introduced in small rolls, shaped with the fingers, the latter being also coated with glycerin. When all the tolu is thus introduced, the mixture is agitated frequently, in a warm place, until all is dissolved, when it is filtered, and sufficient strong alcohol passed through the filter to make exactly 16 fluid ounces. This tincture may be reduced to the officinal strength as wanted, but is particularly useful as an addition to cough mixtures, for which purpose it is readily emulsionized by the aid of gum arabic.—Drug. Circ., March, 1881, p. 65.

Purgative Tincture (Dobell's).—The following formula is given in "Gaillard's Med. Jour.," from "L'Union Méd.":

℞.	Res. podophylli, ...	grs. ij.
	Essentiæ zingiber., ...	ʒj ♏xv.
	Spts. vini recti., ...	ʒij.

M.—S. ʒj at night, when lying down, every two or three nights.

The podophyllin is claimed to act mildly.—Am. Jour. Pharm., March, 1881, p. 135.

Tinct. Ferri Acetic. Æth.—Preparation.—Mr. Ad. Nietsch communicates the following process for a permanent tincture: Twenty-eight parts of liq. ferri subsulph., U. S. P., are mixed with a saturation of 20 parts of bicarbonate of potassium and a sufficient quantity of acetic acid (of sp. gr. 1.047—about 34 parts); 32 parts of alcohol are added, well mixed, the mixture is allowed to stand twenty-four hours, and filtered. The filtrate is placed in a capsule, and 16 parts of the alcohol are evaporated at a gentle heat (or it may be distilled off). After cooling, the liquid is weighed, 8 parts of acetic ether are added, and then sufficient water to make the tincture weigh 94 parts.—D.-A. Apoth. Zeitg., August 1st, 1880, p. 4.

Tincture of Acetate of Iron (Rademacher)—Preparation.—Mr. O. Schlickum proposes the following modified process to prepare the above tincture:

Solution of tersulphate of iron (sp. gr. 1 318), . .	25 parts.
Solution of acetate of potassium (sp. gr. 1 180), . .	31 "
Alcohol, ...	33 "

Mix them, let the mixture stand for twenty-four hours in a well-covered beaker-glass, then strain through a linen strainer, express, and wash the residue with a mixture of equal parts of water and alcohol until 80 parts of liquid are obtained. To this add 20 parts of water.

The resultant tincture (100 parts) has a handsome red color, is very limpid, and keeps exceedingly well, though at first it may deposit very small quantities of sulphate of potassium, from which the clear liquid may at any time be decanted without having recourse to filtration. It contains all the iron of the solution of tersulphate employed,—that is, 2 per cent. of metallic iron, or 8 per cent. of neutral ferric acetate. Both in the percentage of iron, as in that of alcohol, it agrees with the tincture prepared according to Rademacher's original formula. The excess of undecomposed ferric sulphate is not nearly as great as in the latter. Since 25 parts of solution of tersulphate of iron require, for complete decomposition, 31⅓ parts of solution of acetate of potassium, it is evident that only a minute excess of ferric sulphate remains undecomposed. At the same time, only *traces* of sulphate of potassium are left in the tincture: 31 parts of acetate of potassium yield, on decomposition, 9¼ parts of sulphate, of which 8¾ parts crystallize out, from the alcoholic solution, during the first twenty-four hours. The remaining ½ per cent. is mostly deposited during the first period of preservation.

Another method is the following:

Solution of tersulphate of iron (sp. gr. 1.318),	25 parts.
Crystallized acetate of sodium,	14 "
Alcohol,	33 "

The sodium salt is added to the iron solution, and *very gently* warmed in a porcelain capsule until the salt melts. The alcohol is then added, and the whole exposed for some hours to a cool temperature (8°–10° C.), whereby the sulphate of sodium is almost completely separated in crystals. The precipitate is collected on a linen strainer, expressed, washed with a mixture of equal parts of water and alcohol until the strained liquid amounts to 66 parts, and finally sufficient water is added to bring the product to 100 parts.—New Rem., February, 1881, p. 52.

Liquor Ferri Acetici (P. G.)—Mr. R. Rother, after noting various defects and inconvenience in the formula of the Germ. Pharm. for this preparation, furnishes the following as adapted to American pharmacy:

Take of

Solution of ferric sulphate,	1 pint.
Di-sodic carbonate, in crystals,	15 troy ounces.
Glacial acetic acid,	3⅝ "
Water,	sufficient.

Upon the sodium carbonate, contained in a capacious capsule, pour 4 fluid ounces of the solution of ferric sulphate and apply heat; then pour on the remainder of the solution, in rapid succession, 4 fluid ounces at a time, and continue the heat until effervescence ceases; dilute the mixture with 6 to 8 times its volume of water and set it aside, remove the supernatant liquid by means of a siphon, and wash the precipitate two or three times more in a similar manner, or until barium chloride yields no precipitate with the washings. Pour the precipitate upon a filter after the last decantation and allow the superfluous water to drain off. Add the precipitate to the glacial acetic acid contained in a spacious capsule, stir occasionally until effervescence ceases and complete solution has taken place, add water to the weight of 20 troy ounces, and strain the solution through muslin.—New Rem., August, 1880, p. 230.

TROCHISCI.

Medicated Lozenges—Improved Composition.—Dr. Prosser James writes concerning this form of remedy that the lozenges of the Br. P. are most defective on account of their hardness. They irritate the mucous surface; and the sharp corners of some shapes in use, or the broken pieces of others, may enlarge ulcers, tear congested membrane, or do other injury. Of course when used for their constitutional effects these objections do not apply. A softer consistence has been obtained by the use of fruit paste, as in the black-currant lozenges; and this substance has been more extensively used of late years. Extract of licorice, as in "Pontefract cakes," and gelatin, have also been utilized. A more recent innovation is the efflorescent base introduced by Mr. Cooper, which for some purposes is of special value. The French *Pâtê Guimauve* has the defect of not keeping well, and the jujubes which were formerly made with the juice of *Rhamnus Zizyphus*, now never contain that fruit.

An experience of more than a quarter of a century leads Dr. James to conclude that a jujube paste of the best French manufacture will be found most useful as a base.—New Rem., March, 1881, p. 84.

Borax Lozenges.—Some dentists have for several years past successfully used borax lozenges in various affections of the mouth. If the habitual process of the preparation of lozenges is followed, the preparation of these lozenges appears to offer some difficulties, which are, however, avoided in the following process:

Take of

Borate of sodium,	3½ ounces.
Powdered sugar,	30 "
Carmine, No. 40,	3 grains.
Gum tragacanth,	38 "
Distilled water,	2 ounces.
Simple tincture of benzoin,	3 drachms.

Prepare a mucilage with the gum tragacanth, 1 ounce of water, and 1½ drachm of the tincture of benzoin. Mix the carmine with the sugar, and by means of a sieve mix the borax with one-half of the sugar. Strain the mucilage, and add to it by portions the half of the sugar free from borax, and the remainder of the water and tincture of benzoin. Finally, complete the mass by introducing the borated sugar, and divide it into fifteen-grain troches, each of which will approximately contain 1½ grain of borax.—Drug. Circ., May, 1881, p. 67.

VINA MEDICATA.

Digestive Wine.—Professor Schmidt offers a formula for a digestive wine, which he regards to be equal, if not superior, to the most vaunted products. He recommends pharmacists to make their own pepsin. He advises that the rennet solution, after the preliminary treatment of the Codex, should be treated with a mixture of sulphate and phosphate of sodium instead of hydrosulphuric acid, as those salts in excess even are rather likely to be of advantage than otherwise. This solution should be evaporated to the consistence of a firm extract, which, mixed with 10 per cent. of purest glycerin, to keep it soft, he calls "*pepsine extractive.*"

Next he takes malt, crushes it, macerates it for twenty-four hours in ten times its weight of cold water, and afterwards presses through linen. Strong alcohol is to be added to the liquid until 45° is marked on the centesimal alcoholometer. The liquid becomes turbid and yields a considerable precipitate. After standing for twenty-four hours the liquid is filtered, and alcohol again added until 66° is marked. After standing another twenty-four hours the liquid is to be carefully decanted, and may be distilled for the recovery of the alcohol. The muddy precipitate deposited is to be evaporated to a firm consistence, 10 per cent. of glycerin is added, and this he calls "*maltine extractive.*"

For the preparation of a wine of pepsin and diastose of maltine the author now takes:

Pepsine extractive,	5.50	parts.
Maltine extractive,	5.50	"
Common salt,	5.00	"
Good brandy,	45 00	"
Old Chablis wine,	400 00	"
Grenache wine,	500.00	"

Each teaspoonful of this wine contains about 20 centigrams of digestive ferment.—Chem. and Drug., December, 1880, p. 531, from L'Union Pharm., November, 1880.

Wine of Ipecacuanha (Phar. Br.)—*Instability.*—Mr. J. B. Barnes draws attention to the instability of wine of ipecacuanha as made by the process of the Br. Phar. (maceration of the root in wine, Rep.), and proposes to prepare it from acetum ipecacuanhæ (proposed by Mr. Carteighe), by evaporating the latter to dryness, and dissolving the dry extract in sherry wine. This process gives a rich brown solution, which, after keeping for eight months, had not thrown down the muddy sediment so familiar with ipecacuanha wine (B. P.), which has been kept beyond a few weeks. A white crystalline deposit had formed, however, which proved to be cream of tartar, and was very different from the deposit of ipecacuanhate of emetine and cream of tartar which occurs in the wine now used. Dr. Dyce Duckworth (see Proceedings, 1873, p. 193) had already drawn attention to this deposit. The wine as prepared by Mr. Barnes proved an efficient emetic when given to an adult in a 4-fluid drachm dose.—Chem. and Drug., September, 1881, p. 385, from Proc. Br. Phar. Conf.

Wine of Tar—New Formula.—According to Mr. R. F. Fairthorne, tar wine, as usually made, is unsightly, unstable, and unpalatable, and he recommends the following receipt as free from these objections: Rub 4 troy ounces of tar, 5 troy ounces of granulated sugar, and 8 troy ounces of washed and dried sand, first by themselves, and then with 1½ pint of California sherry and sufficient water to make 2 pints. Transfer the mixture to a bottle, agitate occasionally for four or five days, and filter with paper pulp. A fine clear wine, highly impregnated with tar, and which will keep without undergoing acetous fermentation, is thus obtained.—Am. Jour. Phar., July, 1880, p. 372.

MISCELLANEOUS FORMULÆ.

Absorbent Cotton—Preparation.—Mr. Frank L. Slocum has experimented, and finds the following process to yield the most satisfactory absorbent cotton: Take of the best carded cotton batting any desired quantity, and boil it with a 5 per cent. solution of caustic potassa or soda for one-half hour. or until the cotton is entirely saturated with the solution, and the alkali has saponified all oily matter; then wash thoroughly to remove soap, press out the excess of water, and immerse in a 5 per cent. solution of chlorinated lime for fifteen or twenty minutes; again wash, first with a little water, then dip in water acidulated with hydrochloric acid, and thoroughly wash with water; press out the excess of water, and again boil fifteen or twenty minutes in a 5 per cent. solution of caustic soda or potassa: now wash well, dipping again in the acidulated water, and then washing thoroughly with pure water. Afterwards press out and dry quickly. The loss in weight by this process is about 10 per cent.—Am. Jour. Phar., February, 1881, pp. 53–55.

Chlorinated Cotton—Preparation.—Professor Cav. Carlo Pavesi recommends the use of chlorinated cotton, as an effective and economical means of gradually diffusing chlorine gas through the atmosphere of surgical wards in hospitals, or as an external application in wounds which may require antiseptic treatment. In the latter case he preferably uses cotton which has previously been moistened with glycerin, since the latter seems to cause the chlorine gas to be retained for a much longer period.

The chlorinated cotton is prepared by placing into a large vessel with wide mouth a concentrated solution of commercial chloride of lime, which should not occupy more than one-eighth of the volume of the vessel, adding a small quantity of sulphuric acid [better, bisulphate of sodium or potassium, with water, Ed. N. R.], and then suspending in the upper part of the vessel fine carded cotton, either dry or previously moistened with glycerin, in such a manner that the liquid itself cannot come in contact with it. The vessel is then carefully closed and set aside for twenty-four hours.—From Bolletino Farmaceutico (Milano), 1880, p. 177; in New Rem., July, 1880, p. 208.

Antiseptic Gauze—Preparation.—Lehn is of the opinion that the antiseptic material necessary for bandaging, etc., should be prepared by the apothecary, so as to give guarantee of its proper preparation and composition. It is necessary above all that the material should be absolutely free from bacteria. The following method is recommended: Clean, bleached gauze (so-called "mull") is cut in pieces about 5½ meters in length, and exposed for two hours in a disinfecting apparatus, which is heated by steam under pressure. In the mean time a melted mixture of 4 kgm. rosin, 5 kgm. paraffin, 2 kgm. glycerin, 2 kgm. carbolic acid, and 20 kgm. of alcohol is prepared, and 100 pieces of the gauze are immersed until completely saturated; after which the saturated gauze, while still warm, is passed between rubber rollers, so as to remove the excess of liquid, and it is returned for a short time to the disinfecting apparatus and there subjected to moderate heat. It is then folded, again passed through the rollers, and enveloped in parchment paper without further drying. Salicylic and other gauzes are prepared in the same manner.*—Phar. Centralh., May 19th, 1881, p. 209.

A writer in the "Phar. Centralhalle" (June 2d, 1881, p. 236), offers the following as an efficient substitute for the above:

Carbolic Gauze.—Equal parts resina pini, cera flava, paraffin, and ol. provinciale are melted together, and sufficient carbolic acid is added to make a 3 per cent. mixture. The mixture is spread upon very fine-meshed gauze, previously heated; the gauze is folded together, covered with weights, and allowed to stand exposed to a temperature of 60° to 70° until the mixture has thoroughly penetrated. It is

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* While the above method doubtless yields a very good and reliable preparation, it is not very plain how the scale of the manufacture can be avoided. Certainly it is not to be supposed that each apothecary should be provided with a disinfecting apparatus and with facilities for steam heating under pressure, etc., etc. The method, immediately following, is one that can be readily carried out in any well-appointed pharmaceutical laboratory, and probably gives very satisfactory products. A simple method, also, is given in Proceedings, 1879, p. 120.—Rep.

then expressed strongly in a heated press, to remove the excess of the resinous mixture, spread out to cool, and packed as may be thought most suitable

Salicylated Cotton and *Benzoated Cotton* are prepared by immersing cotton-wadding, previously deprived of fat, in solutions of the respective acids in alcohol and water, and containing from 4 to 10 per cent. of the acids as may be desired,—the difference in strength being indicated by some color imparted to the one or the other. After the cotton is thoroughly penetrated by the liquid it is spread out, and dried at a moderate temperature. *Thymol* and *boric acid* cottons are prepared in the same way. *Jute* may be impregnated with the above antiseptics in the same manner, but it must previously be prepared for the purpose by macerating it for half a day in water and then subjecting it to strong pressure. See also Proceedings, 1879, p. 120.

Antiseptic Gauze (*Lister's*).—C. Mercières prepares this by melting together 5 parts of resin, 7 parts of paraffin, and 1 part of crystallized carbolic acid, and dipping into the mixture, for about five minutes, pieces of unsized gauze or muslin. The excess of the mixture is removed by slight pressure, the fabric is spread out in layers, covered on both sides with pieces of gauze to prevent the dropping off of the carbolic mixture, and, after having been placed between two slabs of marble for about twelve hours, completely dried by exposure to air.—Am. Jour. Phar., May, 1881, p. 248, and Arch. d. Phar., February, 1881, p. 148, from Rép. de Phar.

Prepared Catgut for Ligatures.—Prof. Lister, in a recent lecture delivered before the clinical society of London, and a considerable passage of which is reported in the " Phar. Jour. and Trans." (February 25, 1881, pp. 718–720), gives the following directions for preparing catgut (violin strings) for the " catgut ligature " recommended by him: 1 part of chromic acid is dissolved in 4000 parts of distilled water, and 200 parts of pure carbolic acid are then added. Catgut, equal in weight to the phenol, is introduced as soon as the liquid is made. If the liquid is left to itself a precipitate occurs (partly due to mutual reaction of the acids), while in the presence of the catgut it remains clear (the precipitates evidently taking place in the substance of the catgut), though gradually becoming lighter in color. At the end of forty-eight hours the catgut is sufficiently prepared. It is then taken out of the solution and dried, and when dry is placed in *carbolic oil* (1 part carbolic acid to 5 parts olive oil), in which it is preserved for use. In drying the prepared catgut care must be observed that the twist which is given to it is not loosened and its strength thereby reduced. This can be accomplished by stretching it between two fixed points in the room, and allowing it to become perfectly dry while in that position, or, in a small way, the whole process may be conducted by winding the catgut around a small test-tube, fixing both ends by means of sealing-wax near the open end of the tube, and immersing this in a larger tube containing the chromic acid-carbolic solution for forty-eight hours; then allowing it to dry on the tube, and preserving it then in carbolic acid.

Incombustible Paper—Preparation.—A paper which cannot be destroyed by fire is made as follows: A mixture of 2 parts of ordinary paper pulp and 1 part of asbestos is saturated with a solution of common salt and alum, and run through the paper machinery in the usual manner. During its passage over the rollers it is coated with a solution of shellac. Ink prepared with nut-galls and copperas is used.—Phar. Centralh., March 31, 1881, p. 147.

Quillaia Toothwash.—Mr. Alexander E. Bennett recommends the following as forming an excellent toothwash: Soap bark, 4 ounces; glycerin, 3 ounces; diluted alcohol, sufficient to make 2 pints; oil of gaultheria, oil of peppermint, of each 20 drops. Macerate the soap bark in the mixture of glycerin and diluted alcohol for three or four days, and filter through a little magnesia previously saturated with the volatile oil.—Am. Jour. Phar., October, 1880, p. 485.

Coloring for Tooth Powders.—Mr. R. F. Fairthorne recommends that 1 ounce of the best carmine be dissolved in 6 fluid ounces of stronger solution of ammonia, and this solution mixed with precipitated chalk until a powdery mass results, which is then dried. The colored chalk is then added to the other ingredients of the tooth powder, and is sufficient for 13 pounds.—Am. Jour. Phar., March, 1881, p. 98.

Gluten-Bread—Preparation.—Prof. Xav. Landerer directs to prepare gluten-bread by inclosing wheat flour in a linen sack and kneading this under water until no more starch can be washed out, that is, until the water remains clear. The gluten remaining in the sack forms the basis of the bread; it is mixed with yeast or sour dough, also with butter, eggs, and sometimes with chopped meat, sprinkled over with anise or fennel, and then baked. At the same time a generous Greek red wine is recommended to be used as a stimulating drink.—Pharm. Zeit., from New Rem., March, 1881, p. 84.

Glycerin Jelly for Microscopic Purposes.—Dr. Edward Kaiser has succeeded in preparing a really perfect and microscopically pure glycerin jelly, which, when cold, may be used precisely like Canada balsam for mounting microscopic objects, as follows: Soak 1 part of finest French gelatin in 6 parts of distilled water for about two hours; now add 7 parts of chemically pure glycerin, and for every 100 parts of the mixture add 1 part of crystallized carbolic acid. Heat the whole, under constant stirring, for ten or fifteen minutes, until all the flakes caused by the addition of the carbolic acid have disappeared. Finally, filter the solution, while still hot, through very fine glass wool which has been previously washed with distilled water.—New Rem., July, 1880, p. 208.

Gelatin Bougies—Preparation.—According to F. Friedrichs, gelatin bougies may be prepared as follows: Melt together, on the water-bath, 3 parts of white gelatin, 6 parts of glycerin, and 1 part of water. If any remedial agent is ordered to be incorporated, this is, if possible, dissolved in a little water, and added, under constant stirring, with a glass rod. A glass tube of proper diameter (about 3 to 5 mm.) is then selected, the interior of which is oiled, and immersed into the melted mass. By gentle suction, the tube is filled, immediately closed with the finger, and then allowed to cool, which takes but a short time. An oiled plug is then inserted into one end, and by means of a stout wire or rod, the bougie pushed out at the other end. This is then cut into pieces of appropriate length.—Pharm. Zeit., 1880, No. 83; New Rem., February, 1881, p. 55.

Hectograph (Polygraph) and Ink—Composition.—The following additional compositions are given in "New Rem.," July, 1880, p. 219:

1.	Gelatin,	100 parts.
	Water,	375 "
	Glycerin,	375 "
	Kaolin,	50 "

(Lebaigne.)

2.	Gelatin,	100 parts.
	Dextrin,	100 "
	Glycerin,	1000 "
	Sulphate of barium,	q. s.

(W. Wartha.)

3.	Gelatin,	100 parts.
	Glycerin,	1200 "
	Moist sulphate of barium, washed by decantation,	500 cc.

(W. Wartha.)

4.	Gelatin,	1 part.
	Glycerin,	4 "
	Water,	2 "

(Kwaysser and Husak.)

For inks, the following:

1.	"Violet de Paris,"	10 parts.
	Water,	30 "

(Lebaigne.)

2. "Violet de Paris,"	1 part.
Water,	7 "
Alcohol,	1 "

(Kwaysser and Husak.)

3. Acetate of rosaniline,	2 parts.
Water,	10 "
Alcohol,	1 "

(Kwaysser and Husak.)

The first two produce a violet, the last named a red copy.

Ink for Labelling.—According to Dr. Bering, a fine black ink, which flows easily from the pen, and may be used in laboratories, drug stores, etc., for labelling objects which are liable to get wet, or for producing writing which will resist as much as possible, acids and caustic liquids, may be made thus: 20 grams of brown shellac are dissolved in a warm solution of 30 grams of borax in 3 to 400 grams of water, and filtered hot; to the filtrate is added a solution containing 7 5 to 10 grams of water-soluble nigrosin, 0.3 gram tannin, 0.1 picric acid, 15 grams water of ammonia, and 7 grams water.—New Rem., November, 1880, p. 324, from Phar. Centralh., 1880.

Indelible Acid-proof Black Ink.—Dr. Bering, of Bromberg, recommends the following mixture as a superior ink for all purposes where it is desired that the writing should resist acids or other caustic liquids, or the effect of dampness. It is particularly suitable for writing labels, but may also be used for ordinary writing.

Dissolve 200 parts of brown shellac in a solution of 300 parts of borax in 3000 to 4000 parts of water, with the aid of heat, and filter the solution while hot. To the filtrate add 75 to 100 parts of water-soluble nigrosin, 3 parts of tannin, 1 part of picric acid, 150 parts of ammonia, and 70 parts of water. The quantity of nigrosin may be increased, but the author states that 75 parts are sufficient to furnish an ink flowing easily from the pen.—Pharm. Centralh., 1880, No. 35; New Rem., March, 1881, p. 92.

Ink for Rubber Stamps.—Mr. C. Symes dissolves ½ ounce of solid aniline (black, scarlet, or blue) in 2½ ounces of boiling water; then adds 3½ drachms of glycerin and 1½ drachm treacle. If violet de Paris is used, 80 to 90 grains are sufficient.—Drug. Circ., March, 1881, p. 44.

Reagents for Inks.—Mr. William Thompson enumerates the following list of reagents, which are necessary but quite sufficient to distinguish between different inks. The written characters are moistened successively with them, allowed to react a few seconds, and the excess of liquid is then carefully removed with blotting-paper. The characters written with the same ink will show identical reaction, while those written with another ink will invariably show a different reaction. These reagents are:

1. Dilute sulphuric acid; 2, strong hydrochloric acid; 3, ordinary dilute nitric acid; 4, solution of sulphurous acid; 5, solution of caustic soda; 6, saturated solution of oxalic acid; 7, solution of chlorinated lime; 8, stannous chloride; 9, stannic chloride.—Phar. Centralh., October 21st, 1880, p. 383, from Chem. Gaz., September, 1880.

Bronzing Liquid.—Ten parts of aniline red and 5 parts of aniline purple are dissolved in 100 parts of 95 per cent. alcohol, on the water-bath, and the solution, after the addition of 5 parts of benzoic acid, boiled (for five to ten minutes) until it has changed its greenish color to light bronze-brown. Applied with a brush upon *leather*, metal, or wood, the liquid produces a magnificent bronze coating.—From Bayr. Ind.- und Gewerb.- Zeit., in New Rem., March, 1881, p. 85.

Gutta-percha Gloss Blacking.—To 30 parts of syrup, contained in a boiler, add 9 parts of lamp-black and 1½ part of finest bone-black, and mix the whole intimately together. Heat 1½ part of gutta-percha, cut into small pieces, in a kettle over a coal fire, until it is nearly all melted, add to it gradually, under constant stirring, 2½ parts of olive oil, and when the gutta-percha is all dissolved, ½ part of stearin. Pour the latter mixture, while still warm, very slowly and gradually, into the first mentioned mixture, and, when the whole has been thoroughly incorporated, add a solution of 2$\frac{1}{10}$ part of gum senegal in 6 parts of water, likewise stirring. Finally, the product may be aromatized by the addition of $\frac{1}{10}$ part of oil of rosemary or lavender.

This blacking produces a fine gloss of a deep black. It is not injurious to leather.—Neueste Erfind. und Erfahr., in New Rem., March, 1881, p. 85.

MATERIA MEDICA.

a. Vegetable Drugs.

General Subjects.

Medicinal Plants—Cultivation in the Nilgiris.—Mr. A. Jamieson, superintendent of the Government Botanical Gardens, Ootacamund, reports the progress made in the cultivation of various medicinal plants. In addition to those now under cultivation, he expects to experiment with *Aconitum Napellus*, *Atropa Belladonna*, *Colchicum autumnale*, *Gentiana lutea*, *Hyoscyamus niger*, *Convolvulus Scammonia*, *Artemisia sps.*, and *Valeriana officinalis*; all of which, he thinks, will be found to thrive either at Ootacamund or Kalhatti. In addition to jalap (which see), the plants below noted are being propagated and planted out as rapidly as young plants can be produced.

Peppermint.—After a full year's trial the cultivation of peppermint at Ootacamund has been discontinued, the climate being too cold to produce a luxuriant growth. The plant grows rapidly during the autumn months, but becomes stunted and withered as soon as the dry, frosty weather sets in. The entire stock is therefore being transferred to the newly-formed nurseries in the Kalhatti gardens, where there is a more forcing climate and an abundant supply of water at command throughout the year.

Rhubarb.—The stock of rhubarb has not increased so rapidly as was anticipated. The original plant having not yet borne seed, the propagation has in consequence been confined to the division of the older plants. The plants appear to thrive better in the Kalhatti gardens and will be transplanted. Mr. Jamieson believes that only a four years' growth of the plant will be required to yield a return of properly developed sorts, while at Banbury, England, it is considered advantageous to allow the roots to remain in the ground six or seven years.

Rosemary and *Lavender* grow freely in a friable, loamy soil in Ootacamund, and are easily propagated by cuttings.

Taraxacum and *Digitalis* grow so freely in Ootacamund as to require no special care.—New Rem., March, 1881, p. 83, from Chem. and Drug.

African Oil Seeds.—Dr. J. Moeller describes in Dingler's "Polyt. Jour." (vol. 238, 1880), a series of oil seeds from the west coast of Africa, giving numerous illustrations of the seeds and of the microscopic structure of their more important parts. Some of these seeds, containing large percentages of fats, deserve particular attention, while others are interesting on account of their peculiar character.

Monodora Grandiflora (vernacular "Toussa") has cylindrical seeds, about two cm. in length, nine mm. broad, of a velvety, glistening light-brown color. Its colorless kernel contains principally albuminoid substances and a few oil-cells, containing an oil which is said to be valued equally to that of nutmeg.

Bassia Oleifera, D. C., is in all probability the plant which yields the seeds which occur under the names of "Djave" and "Nungu," and the fat of which is used in the Gabon as food and as an embrocation for rheumatism. The seeds are plum-shaped, smooth, glistening light-brown, with the exception of a large elliptic scar of red-brown color. The seed-coat is quite hard, and 2.5 mm. thick; nevertheless, the kernel weighs on the average 5 grams.

Bassia Butyracea, Roxb., furnishes roundish seeds, resembling those of the horse chestnut, smaller than the above, the seed-coat being only 0.6 mm. thick, and the kernels weigh on the average 4 grams. This seed is the source of "Shea butter," which is also obtained from *Bassia Parkii*, G. Don.

Coula Edulis, H. Baill.—This furnishes globular seeds, resembling a walnut, having a thick (3 mm.) hard shell. It must not be confounded with the *cola-* or *guru-nut.* The almond-like kernel contains chiefly starch in the extremely thin-walled cells, very little fat (though the catalogue of the Paris Exposition names 32.88 per cent.), and no protein substances.

Pentaclethra Macrophylla, Benth. (vernacular "Owala").—Large (7 cm. long and 4.5 cm. broad), flat (1 cm. thick) seeds. The seed-coat is 0.5 mm. thick; the cotyledons weigh 10-19 grams, are dark-brown, and contain, besides fat (48.92 per cent. it is stated), coloring matter, albumen, and tannin in considerable quantities.

Dryobalanops, Sp.? (vernacular "Ochoco").—Cake-shaped, cinnamon-brown seeds, weighing 6 grams, and composed of an embryo (which contains no albumen) and spongy tissue. The cotyledons have the consistence of stearin, and contain an enormous quantity of fat in amorphous and crystalline condition.

Chrysobalanus Icaco, L. (vernacular "Ouaraye" or "N'Pendo").—Small stone fruits, pear-shaped, with nerves strongly protruding from the dried pulp. The cotyledons are 3-4 mm. thick, reddish-brown, crooked, and inclose a hollow. Their tissue is filled with a colorless mass (showing peculiar micro-chemical reactions), in which fat-globules and protein substances are inclosed. The oil is said to be particularly useful in preparing salves, and also finds application in dysentery.

Irvingia Barteri, Hook.—Broad elliptical seeds, covered with a dense felt of light-colored coarse hairs. They are of the size of a pigeon's egg. The extremely hard seed-coat is composed of a tissue of sclerotic fibres, the bundles of which form hairy excrescences which penetrate into the pulp of the fruit—a very interesting anatomical structure. The cotelydons are white and resemble large almonds. They contain, besides albumen, a large quantity of fat, which, by the natives, is called "Iba" or "Dika," and by Europeans, "Gabon-chocolate," and is consumed by the latter in large quantities.—Phar. Centralh., February 24, 1881, p. 90.

Wanika—A New African Arrow Poison.—Mr. A. W. Gerrard has subjected a new African arrow poison to chemical and physiological examination. The poison, which was sent by Mr. R. W. Felkin (who has been travelling in Africa through Livingstone's territory) to Dr. Sidney

Ringer, is made by the "Wanika" and "Wakamba" tribes, who live to the west of an island called Mombasa, on the east coast of Africa between Zanzibar and the Sourali Land. It is said to be made from eleven different roots, which are at present unknown, but one of which, and perhaps that to which the poisonous action is chiefly due, is believed by Mr. Gerrard to be a *Strophanthus*, either *S. hispidus* or *S. Kombé.* He bases his opinion on the physiological action of the poison, which is identical with that of extracts of authentic seeds of a *Strophanthus.* The poison, with which the barb of the arrow is smeared, is enveloped in the leaf of a variety of grass or maize, the entire parcel in size and form being much like a sausage. Its length is 4½ inches, and circumference 3 inches. At each end it is tied with a strong ligature, one end of the ligature being carried about an inch down the parcel, turned at right angles, and passed round its circumference, then looped; this is repeated four or five times until the other extremity is reached, and firmly tied. Its weight averages 1½ ounce. On breaking a parcel a black extract, of firm consistence and almost odorless, was found in the interior. Subjected to chemical examination, the absence of an alkaloid and the presence of a glucoside was determined. The latter, as obtained, is amorphous, and represents the activity of the poison.

Regarding the action of the arrow poison, Mr. Felkin says that death follows a wound in some fifteen or twenty minutes, and unless the antidote is given within five minutes of the time when the wound was received it does no good. This antidote, strange to say, is prepared from five roots (also not known, though samples, too small for pharmaceutical investigation and determination, accompanied the poison) by converting them into charcoal and preserving this, coarsely powdered, in a bottle-shaped gourd. Judging from the taste of these roots, they do not appear to possess any active property. It is still more difficult to believe how they can retain it after they have undergone carbonization; yet Mr. Felkin has seen the antidote used with success in cases in which he convinced himself that the poison had been absorbed.—Phar. Jour. Trans., April 9th, 1881, pp. 833–835.

ALGÆ.

Fucus Vesiculosus—Examination of Ash, etc.—Mr. Frank Frisby has made a determination of the ash of Fucus vesiculosus and an analysis of its constituents. Ten parts of the plant are composed of 6.15 parts of organic matter, 2.26 parts of water, and 1.59 of ash, composed as follows: Potassium chloride, .348; sodium iodide, .252; sodium bromide, .324; magnesium phosphate, .312; calcium phosphate, .225; calcium sulphate, .138 = 1.599. The author also determined the presence of mannite (.046 from 10 grams), and of an odorous volatile oil (.012 from 10 grams of drug).—Am. Jour. Phar., September, 1880, p. 435.

Vegetable Gelatin—Japanese Isinglass, so-called.—Dr. Leon Marchand reviews the history and sources of the gelatinous substance which for a long time has been imported into Europe from China and Japan under various names, such as Japanese isinglass, Agar-agar, Tchin-tian, Lo-thá-ho, etc. The names ichthyocoll, glue, glutin, and gelatin, which have been used to designate this substance, are all incorrect, and inasmuch as it is doubtless derived from various species of *algæ* (the author enumerates no less than twelve species), the author prefers the name *phycocoll* (glutin of algæ), which corresponds with ichthyocolla (fish glutin), and there would be Chinese, Japanese, and Bengal phycocoll, according to its derivation.—New Rem., January, 1881, p. 13; from Bull. de la Soc. Bot. de France, 1880, p. 287.

Gelose—Characters.—Morin finds that the gelose contained in the so-called Chinese moss (Agar-agar) forms in a colorless, transparent, and stiff jelly, even with 1 part to 500 parts of water; while when dissolved in acid no jelly forms on cooling. Its solution is left-rotating, but when boiled with weak sulphuric acid it becomes right-rotating. By the action of nitric acid it yields mucic and oxalic acids. It contains, when it is dried, 22.85 per cent. of moisture, and yields 3.88 per cent. of ash.—Am. Jour. Phar., September, 1880, p. 467; from Compt. Rend.

FUNGI.

Ergot—Active Form.—Dr. S. Schaefer, who has an extended clinical experience with ergot, expresses the opinion that it can only be relied on when it is used in substance. The powder, which need not be very fine, should be prepared at the time when it is dispensed. He maintains that the aqueous extract, sclerotic acid, and scleromucin, when exposed for some time to the air, lose their activity, and they retain their uniform activity, under the most favorable circumstances, only for a short time.—Phar. Centralh., June 2d, 1881, p. 237.

The editor of "Phar. Centralh.," commenting on the above, believes that the strictures of Dr. Schaefer must be received with some allowance. The various preparations of ergot have by others been found to possess satisfactory activity, and their production is based upon scientific investigation and research of high order.

AROIDEÆ.

Acorus Calamus, Linn.—*Uses, etc., in India.*—Mr. W. Dymock states that the rhizome (*Bacha*, *Bach*, Hind., Beng.; *Vekhand*, Bomb.) is considered by the Hindus to be emetic in large doses, and carminative, stimulant, and tonic in small doses. The Mahometans describe it as deobstruent and depurative. It has also a reputation as a diuretic, emmenagogue, and aphrodisiac. The plant is originally a native of Central Asia. The root-stock occurs in somewhat tortuous, subcylindrical or flattened pieces, a few inches long, and from ½–1 inch in greatest diameter. Each piece is obscurely marked on the upper surface with the scars, often hairy, of leaves, and on the under with a zigzag line of little elevated, dot-like rings, the scars of roots. The root-stock is usually rough and shrunken, varying in color from dark-brown to orange-brown, breaking easily with a short corky fracture, and exhibiting a pale-brown spongy interior. The odor is aromatic and agreeable; the taste bitterish and pungent. A section of the rhizome, under the microscope, is an open network, composed of rows of nearly round cells and open spaces (water-passages).' Most of the cells contain small starch-granules, but some of them essential oil. At the junction of the cortical and central portions of the rhizome is a very distinct row of small, empty cells. The vascular bundles are numerous, especially just within the line of small cells just noticed; each bundle consists of a ring of spiral vessels surrounding a number of jointed tubes.—Pharm. Jour. and Trans., July 10, 1880, p. 21.

Arum margaritiferum, Roxb. (?)—*Uses, etc., of the Seeds in India.*—A large Amorphophallus, growing at Asnora in the Goa territory, is believed by Prof. W. Dymock to be this species. The country people use the crushed seed to cure toothache. A small quantity is placed in the hollow tooth and covered with cotton; it rapidly benumbs the nerve. They also use it as an external application to bruises, on account of its benumbing effect. The fruit is yellow, about the shape and size of a pistachio-nut, closely set round the upper part of the spike, which is several feet in height, and as large as that of the plantain. The skin of the fruit is tough, the pulp scanty yellow; it incloses two seeds having the shape of a coffee-bean, and placed with their flat surfaces in apposition. The testa of the seed is soft, greenish-brown externally, green internally; the kernel is white, adhering close to the testa, soft and juicy when fresh, but rapidly becoming hard and dry when cut. The taste is intensely acrid; after a few seconds it causes a most painful burning of the tongue and lips, which lasts for a long time, causing much salivation and subsequent numbness. A section of the fruit and seed shows the following structure from without inwards: (1) Several rows of thick-walled cells, having yellowish-brown granular contents (*skin*). (2) A parenchyma composed of thin-walled cells, having no solid contents, except needle-shaped crystals (*pulp*). (3) Several rows of small cells, containing chlorophyll (*testa of seed*). (4) A delicate parenchyma, the cells of which are loaded with very small starch-granules, mostly round, some truncated (*kernel*). The Goa name of the plant is "uzomut" or "azomut."—Pharm. Jour. and Trans., July 10, 1880, p. 21.

CYPERACEÆ.

Cyperus rotundus, L., *and C. pertenuis*, Roxb.—*Uses in India.*—The aromatic tubers of these plants, which are considered by botanists to be only varieties of the same species, are used in India, according to Prof. W. Dymock, for a variety of ailments, being considered diaphoretic, astringent, and stomachic; useful also in febrile complaints and as anthelmintics. The ovoid or nearly round tubers of *C. rotundus* are developed upon a thin underground stem; externally they are black, scaly, and give off numerous fine rootlets; at their summits the remains of leaves and often one or more small tubers may be seen. The substance of the tuber is white and spongy; it has a faint aromatic odor, like that of "calamus." The tubers of *C. pertenuis*, called "nargamotha," the kind in general use, are elongated, simple, or branched tubers, generally about 2 inches long and ½ inch in diameter. The external surface is marked by a number of annular ridges, and is almost concealed by the remains of leaves. When these are removed, the color of the tuber is a deep brown-black. A few wiry rootlets arise from its under surface, and at the lower end is a portion of the underground stem. The substance of the tuber is hard and of a reddish-white color; it is divided into a central and cortical portion, the latter being of a darker color. The odor is strongly aromatic, like calamus, but somewhat terebinthinate. Under the microscope, the outermost layer of the cortical portion is shown to be composed of large bundles of reddish-brown stony cells, separated from one another by interspaces; within it are from 6–8 rows of very thick-walled, empty cells; next a tissue of thick-walled cells, most of them full of large starch-granules, but some containing essential oil and probably resinous matter. The central portion of the root is separated from the cortical by a single row of small yellow stone cells; it is composed of thick-walled cells, full of starch, like those in the cortical portion, but differs from it, inasmuch as many of the cells contain red coloring matter. Large vascular bundles abound in the root; some of them are surrounded by layers of stony cells.—Pharm. Jour. and Trans., August 28th, 1880, p. 169.

GRAMINACEÆ.

Wheat-anthers—Antiperiodic Properties.—Dr. R. Reiche had his attention drawn by some non-professional person to the antiperiodic effects of the so-called flowers, or rather anthers, of the "winter-wheat" (*Triticum hibernum*, L., or Siligo). These anthers (*Flores siliginis*) are used in Hungary as an abortive, and are also said to act as a styptic in uterine hæmorrhages. Their taste is agreeably bitter, and is only developed by protracted chewing. It has no perceptible effects upon digestion, secretion, or the sensory nerves. It is effective in intermittent fever, and is administered in mild cases, three times daily, in a quantity sufficient to cover the point of a knife; in severe cases it is given every two hours.—Arch. d. Pharm. and Ph. Z. f. Russl.; New Remedies, December, 1880, p. 371.

Stigmata of Maize—Activity due to a Peculiar Acid.—Dr. Vauthier states that the action of the stigmata of maize—which is always favorable in all affections of the bladder, whether recent or chronic—is due to *maizenic acid*, a substance which is not described, but the dose of which is one-eighth of a grain. Maizenic acid, moreover, has the power of dissolving calculi by its chemical action; and not only vesical calculi, but also all the other calcareous concretions that are met with in the human system. Hence its use seems indicated in cases of gout and rheumatism, as well as in affections of the urinary organs. The author uses the stigmata in infusion (10 : 100), the dose of which is a tablespoonful every two hours; and in form of extract, the dose of which is one to three grains.—Am. Jour. Phar., April, 1881, p. 187, and Med. News, March, 1881; from Lond. Med. Rec., January 15th, 1881.

Stigmata of Maize—Causes of Variability in Effect.—Professor Castan, who has found the stigmata of maize to be of great use as a remedy in gravel and nephritic colic, is of the opinion that in the latter disease the stigmata acted less as a diuretic than as a local anæsthetic. He attributes the different results which the use of the stigmata has given in the hands of different observers, to the fact that the strength of the extract varies according to the nature of the soil, to the climate, to the time and mode of picking, and to the manner of drying the stigmata. The formula for a preparation of definite strength is not yet fixed, since the quantity of the active principle (? Rep.) varies in different samples of the stigmata.—New Rem., September, 1880, p. 260; from The Practitioner.

MELANTHACEÆ.

Colchicum Seed—Extraction.—Mr. Lemuel I. Morris has made a number of experiments to determine the best method for extracting colchicum seed. He concludes:

1st. That it is a waste of time and useless operation to powder colchicum seed, as the active principle can be wholly extracted by digesting them in the ordinary menstrua for a few hours at a temperature of 80° C.

2d. That alcohol stronger than dilute (sp. gr. 0.941) is unnecessary for any of the liquid preparations of colchicum seed, since the whole of the alkaloid can be extracted with that menstruum, or even with water.

3d. That the active principle is so soluble in the menstrua directed in the different officinal preparations, that it is impossible for it to be precipitated from such solutions, either as colchicia or in its modified condition colchicein.—Am. Jour. Phar., January, 1881, pp. 6–8.

Hermodactylus (Colchicum, Sp.)—*Uses in India.*—According to Professor W. Dymock the corms of two varieties of colchicum—the tasteless and the bitter hermodactyl—finds medicinal application in India for rheumatism, gout, etc. European physicians, however, consider the tasteless hermodactyl inert or nearly so, and the bitter to have properties similar to colchicum. The author gives the description as given by Pereira, which agrees exactly with the drug as observed by him. The starch-grains of the tasteless hermodactyl are large and muller-shaped.—Phar. Jour. Trans., August 28th, 1880, p. 169.

SMILACEÆ.

Smilax China—*Uses in India.*—Professor W. Dymock states that China root is regarded in India as a comparatively new medicine, having been introduced by the Portuguese, however, before the middle of the sixteenth century. It is consumed in enormous quantities both in India and China, the natives considering it to be antirheumatic, antisyphilitic, aphrodisiac, and demulcent. The tubers of *chob chini* (as the plant is called), which are formed upon the fibrous roots of the plant, are of the shape and size of an elongated kidney potato, somewhat flattened, knotty, covered with a rusty-colored bark, sometimes smooth and shining, sometimes rough ; internally their substance is of a pinkish-white color, hard and farinaceous, insipid, mucilaginous, and inodorous. The drug is usually peeled and trimmed, and consequently is of irregular form, resembling a piece of soft pinkish-white wood. Microscopically examined, the bark is seen to consist of thick-walled, dark-brown, brick-shaped cells, which contain bundles of crystalline needles and resinous matter. The bulk of the tuber is made up of a parenchyma, the cells of which are large, thin-walled, and loaded with starch ; some pink coloring matter is also present. The starch-grains are large, and have a radiate hilum. The vascular system is scalariform, and is associated with porous wood-cells.—Phar. Jour. Trans., August 28th, 1881, p. 170.

Sarsaparilla—*Collection.*—Mr. H. H. Smith gives the following account of the collection of sarsaparilla on the Amazon : From the head of the Igarapé-assú (a small tributary of the Mahica, a loop on the southern side of the Amazon River, about 11° W. and 2.30° S.), there is a little narrow path, leading back through the swamp, where one must wade up to the knees in black mud; beyond the trail passes on to the thick forest. There the sarsaparilla gatherers go every year, remaining for weeks together by a little muddy pool, where the water swarms with leeches, yet it seems wholesome enough for drinking. Mr. Smith once spent four or five days at this place, going out every day with his Indian companions, who searched the forest for miles around. After a little he learned to recognize the prickly sarsaparilla vine, and to distinguish from it two or three other species of a similar appearance. The men showed him how to dig the roots with a sharp stick, taking care that the larger ones were not broken; they were often 10 feet long, but lay very near the surface. Sometimes they found half a dozen roots springing from one vine, together weighing perhaps two or three pounds; they were all uncovered carefully, and cut off near the stem; a little earth was then drawn about the stump, so that they would send out new shoots. The Sabzeiros take mental notes of these places, and return to them during the next season. The roots are sold to traders, and finally exported to Europe and the United States. Mr. Smith has no doubt that sarsaparilla will be cultivated in time, as it might be with good profit. Indeed a beginning has been made, a Mr. Rhome having quite a thriving little plantation of the vines at Taperinha; but some years must pass before they are very productive. According to the "Anglo-Brazilian Times," the province of Amazonas, Brazil, exported 199 tons of sarsaparilla in the years 1878–79.—Chem. and Drug., December, 1880, p. 534.

LILIACEÆ.

Scilla Maritima—Proximate Examination.—A. Riche and A. Rémont have studied the various constituents of the bulb. They find the bitterness of the bulbs is very different in comparing even the scales taken from the same portion, and that the juice may be saccharine, or not at all bitter. This circumstance is attributed by the authors to a ternary principle, comparable to soluble starch, gum, or to inulin, which they have succeeded in isolating, and for which they propose the name

Scillin, the name "scillitin" having been applied to the bitter toxic principle. The scillin was obtained in form of a spongy, amorphous, yellowish-white mass, soluble in water in all proportions, but sparingly soluble in alcohol. It is readily converted by the action of acids into sugar (lævulose), and probably also by diastase or an analogous ferment in the plant. Its aqueous solution deviates to the left, and it possesses no reducing action. It is not precipitated by neutral acetate of lead, and, by the basic acetate only from concentrated solution. By the action of nitric acid no mucic acid is formed. Elementary analysis gave numbers approximating to $C_{12}H_{10}O_{10}$.

The proportionate constituents of three bulbs taken at the same stage of development is given as follows:

Proportionate composition.	Very bitter bulb.	Slightly bitter bulbs.	
Water,	73.30	72.00	77.57
Cellulose and insoluble salts,	15.59	19 80	12.53
Scillin,	8.50	6.84	8.03
Sugar,	0 17	0.15	0.68
Soluble mineral matter,	0·32	0.24	——
Scillitin, Oxalic, citric, and malic acids, Undetermined substances,	2.12	0.97	1.19

—Am. Jour. Phar., November, 1880, p. 550, from Jour. de Phar. et de Chim., October, 1889.

Mr. Frederick Power, referring to the above, observes that it seems possible that the new substance described as scillin may prove to be identical with the *sinistrin* discovered by Schmiedeberg in 1879, and to have the formula $C_6H_{10}O_5$. The two substances agree in their general character.—Ibid., p. 552.

Jafferabad Aloes—Source and Characters.—Mr. E. M. Holmes gives the following description of Jafferabad aloes, occurring in the Bombay market; a specimen received from Dr. Dymock is a circular flattened cake, 7½ inches in diameter, and ¾ of an inch in thickness. Externally it is of a black color, and having a lustre not unlike that of pitch, to which at first sight the aloes bears some resemblance. The fracture is black and glassy, and very slightly porous, as if heat had been used in its preparation. The powder, when two pieces are rubbed together, is of a pale brown hue. When the glassy broken surface is breathed on, it becomes, after a time, of a brownish hue, and under the lens looks like aventurine, apparently owing to an immense number of minute cracks, causing the partial separation of minute translucent laminæ. The odor is a characteristic one, having some resemblance to that of Socotrine aloes, but less fragrant, as if it contained a trace of Barbadoes aloes and sandal-wood. The taste of the decoction is not so pleasant as that of the Socotrine aloes; but the amount of matter insoluble in water seems to be equal in amount to that of the Socotrine aloes. In its chemical behavior also it is similar to the latter; with nitric acid no change takes place, but when the vapor of nitric acid is passed over the mixture of Jafferabad aloes and oil of vitriol a slight greenish tinge is developed, quite different from the distinct blue color developed by Natal aloes when similarly treated. Dr. Dymock, who has cultivated the Jafferabad aloes plant in his garden, has sent a few blossoms to Mr. Holmes, which are considered by Mr. J. G. Baker, of Kew, to belong to *Aloe Abyssinica*.—Phar. Jour. Trans., March 5th, 1881, p. 733.

Aloes—Bornträger's Test.—In "Zeitschr. f. Anal. Chem." (1880, p. 165), Mr. Hugo Bornträger described a test for the presence of aloes, which he believed to be characteristic, easy, and very delicate, 1 part of aloes in 5000 being evidenced by it. This test consists in shaking a little of the suspected liquor with about twice its bulk of benzene, allowing this to separate, decanting, and then shaking with a few drops of strongest solution of ammonia. This is again allowed to separate, when, if aloes is present, the ammonia solution will be of a beautiful clear red color. In the case of solids a cold alcoholic solution is made and treated in the above manner.

Mr. Richard H. Groves has now made experiments with a view to determine the value of the test, as well as the principle in the aloes to which the reaction is due, and has arrived at the following results:

1st. That the test could not be relied upon in solutions in which Natal aloes might be present, having a less concentration than 1 per cent., and that in no case can it be used in solutions as dilute as 1 part in 250.

2d. That the color is not due to aloin, and if due to a tannin-like substance, it must be a variety which is soluble in benzene.

3d. That extreme care must be taken when employing this test for the detection of aloes that the benzene layer is perfectly clear before decanting from the underlying liquor.—Phar. Jour. Trans., June 18th, 1881, p. 1045.

Muscari Comosum—Use of the Edible Bulbs in Greece.—Professor X. Landerer observes that in all Greek markets, and especially in that of Athens, small onion-like bulbs, preserved in vinegar, are sold, which are much esteemed as an easily digestible, slightly laxative article of diet, being generally eaten with meat. Dioscorides mentions them under the name of *βολβὸς ἐδώδιμος* ("eatable bulb"). The Albanians call them *tongöl*, and eat them either boiled or preserved in vinegar.—New Rem., August, 1880, p. 231.

Gloriosa Superba—Poisonous Principle.—Dr. C. J. H. Warden has made some preliminary experiments with a view to isolating the poisonous principle of *Gloriosa superba*, a climbing plant found in low jungles, and in the beds of ravines and edges of rivers throughout India. The poisonous character of the roots is well recognized by Europeans as well as native physicians, and it appears to be quite frequently used by natives for the purpose of suicide. The roots are tuberous, cylindrical, bent at a right angle near one end, knotty at the angle, and occasionally much pointed at both ends, varying in length from two to eight inches, generally about the size of a finger or thumb, but sometimes thicker. The knot bears a mark of the stem on the upper surface, and gives attachment to many thin rootlets by the lower. The roots are also found bulbous. The fresh roots are plump and juicy, and surrounded by a brownish epidermis, beneath which is a tegumentary layer of a waxy yellowish hue, in which spots of a deep yellow color are frequently visible. If the root is dug up before flowering the epidermis covering is white, and is easily separable into layers, and gives marked indications of the presence of tannic acid. On section, the root substance is of a white color, and consists of cells containing starch-granules. The juice is strongly acid in reaction, and slightly bitter without being acrid. The old roots are shrivelled in appearance and rather sweet to taste; on section, the cells under the microscope are found to be apparently enlarged, with a diminution of the starch-granules. The roots, when dried by exposure to air, break with a starchy fracture; but if dried in a hot-water oven at 100°, the fracture is glassy. Lindon and Mason describe the flowers of this plant as follows: "One of the most curious flowers in the Tenasserim country is the *Gloriosa superba; 'Gloriosa,'* on account of the glorious color of its flowers, and the elegance of their form. The flowers are as large as a lily, and hang down; the petals, stamens, and style, all turn, and grow up like a flower turned inside out, and then to complete the oddity the leaves prolong their extremities into tendrils, and the plant walks on its toes."

According to native writers the root is applied in blood diseases, swellings, wounds, abscesses, and pains. Mr. Moodeen Sheriff states that the root is not poisonous in 12-grain doses, and ascribes to it alterative, tonic, and antiperiodic properties. He also states that the root is considered by native practitioners and druggists in Southern India to possess nearly the same properties as the root of *Aconitum ferox*, and hence its names, "Nát-ká-bachhnág," country aconite, and "Adavi-nábhi," wild aconite; and this probably accounts for the statement by Dr. George Bidie to the editor of the "Indian Pharmacopœia," that he found the roots of *Aconitum ferox* sold in Mysore largely adulterated with *Gloriosa superba*. Dr. Warden found the fresh roots to contain 81.06 per cent. of moisture, and to yield 4.583 per cent. of mineral matter on ignition, of which 1.538 per cent. was insoluble in water. The fresh roots, dried completely at 100° C., yielded to alcohol 13.01 per cent., and to water 23.98 per cent. extractive; the old roots, collected late in the season, some time after flowering, yielded 6.06 per cent. to alcohol, and 19.41 per cent. to water. By suitable treatment he obtained from the alcoholic extract two resins, *a* and *b*, both in a pure state, and a bitter principle, *superbin*, in an impure state. The latter is highly active, .047 gram injected into the stomach being sufficient to kill a full-grown cat. The author proposes to continue his experiments, and in conclusion remarks, that bearing in mind that *Gloriosa superba* belongs to the same natural order as *squill*, and comparing the physiological action of the two drugs, it may be assumed that the active principle of *Gloriosa superba* is closely allied to, if not identical with, that of *Scilla maritima*.—Phar. Jour., Trans., December 18th, 1880, pp. 495, 496.

Crinum Asiaticum, Linn.—Uses, etc., of the bulbs and leaves in India.—(Vernacular: *Sukhdarsan, Barakavar* (Hind., Beng.); *Vishamungil* (Tam.); *Nágdown* (Bomb.).—According to Prof. W. Dymock, this plant is very common in the neighborhood of Bombay, where, however, it does not seem to find medicinal application. Ainslie states that the natives of Southern India use the bruised leaves, mixed with a little castor oil, as an application for repelling whitlows and other inflammations. Its principal uses, however, appear to depend on its emetic properties. Sir W. O'Shaughnessy remarks that it is the only indigenous and abundant emetic plant, of which he has experience, which acts without producing griping, purging, or other unpleasant symptoms. The root has been made officinal, in the "Phar. of India," as an emetic, nauseant, and diaphoretic, and directions are given for making a juice and a syrup. The dose of the former is 2–4 fluid drachms every twenty minutes until emesis is produced. Prof. Dymock describes the root as bulbous, white, with a terminal stoloniferous, fusiform portion issuing from the crown of the bulb. It varies greatly in size; odor narcotic and disagreeable. Examined under the microscope, the central portion of the bulb (stoloniferous fusiform portion) is seen to consist of a parenchyma made up of polyhedral cells, containing a little granular matter and some needle-shaped crystals; it is traversed by numerous bundles of jointed and spiral vessels. Surrounding the central portion is a cortical layer less vascular than the central column. From both of these spring the subterranean bases of the leaves, which form the upper part of the bulb. Nothing is known of its chemical composition, and it is not an article of commerce.—Phar. Jour. Trans., July 10, 1880, p. 22.

Xanthorrhœa Resins.—Prof. J. M. Maisch draws attention to the resinous exudation obtained from plants belonging to the genus *Xanthorrhœa*, which at different times have found their way into commerce under various names. Recently attention has again been directed to these resins by the importation, under the name of *gum acroides*, of a "new" Australian product, which proves to be *acaroid* resin, more commonly called Botany Bay gum or resin. Prof. Maisch gives the history of the various resins that have been described from time to time, from which it appears that three principal varieties exist: a yellow resin, a red resin, and a brown resin. The first of these is the so-called Botany Bay gum, while the second is known as Cowboy gum. They appear to have a composition resembling that of benzoin and tolu, and have been repeatedly suggested as possessing some value in perfumery; but they are evidently inferior for this purpose to benzoin, storax, and the balsam of Peru and tolu, and their medicinal properties, also, are not well marked. A tincture has been employed, made with equal weights of resin and alcohol, and another made in the proportion of 2 ounces to 1 pint. The latter, if used at all, would, in the opinion of the author, furnish a preparation of the proper strength.—Am. Jour. Phar., May, 1881, pp. 217–220.

DIOSCOREACEÆ.

Dioscorea Villosa—Medicinal Uses.—A correspondent in Iowa speaks highly of the fluid extract of the wild yam in bilious colic, and he relates a very severe case in which a teaspoonful gave immediate relief. It has long had a (local? Rep.) reputation as a "colic root." The active principle is supposed to be allied to ipecac.—Am. Jour. Phar., March, 1881, p. 136, from Med. and Surg. Rep., February 5, 1881.

AMARYLLIDACEÆ.

Curculigo Uncifolia.—Uses of the root in India.—(Vernacular: *Kali-musli*, *Musli-kand*, Hind., Beng., Bomb.); *Nilap-panaik-kizhangu* (Tam.). Two kinds of *musli* are described by Hindu and Mahometan writers; the one as white, the other as black. The latter, according to Prof. W. Dymock, is the only kind met with in Bombay. It is prescribed in asthma, piles, jaundice, diarrhœa, colic, and gonorrhœa, and is considered to be a demulcent, diuretic, tonic, and aphrodisiac. The dose is 180 grains, to be beaten up with 180 grains of sugar in a small glass of water, until it forms a thick mucilage. Native medical works direct that the two-year-old plants are to be selected, and the roots, having been marked and cleared of rootlets, are to be sliced with a wooden knife, threaded upon a string, and dried in the shade. The drug occurs as short transverse sections of the root, half an inch or less in diameter, covered externally by a dark-brown bark. The substance of the root in the black variety is opaque and grayish-brown; in the white variety (*C. orchioides*, Gaertn.), amber-colored and translucent. Portions of the characteristic wrinkled vermicular rootlets may usually be found attached to some pieces. The taste is mucilaginous and slightly bitter. Under the microscope, the fresh root of *C. uncifolia*, when cut across, presents a firm, milk-white, opaque surface, marked with numerous minute punctures. Thin sections show that it consists of a cortical and central portion, both composed mainly of a delicate parenchymatous tissue, loaded with small starch-granules; here and there a large cell contains a bundle of needle-shaped crystals. The large open passages, which can be seen with the naked eye, are almost entirely confined to the cortical portion; they are lined by the walls of the neighboring cells. In the central column are numerous bundles of spiral vessels, which are mostly situated near its junction with the cortical portion. Many of the starch-granules are muller-shaped. A chemical examination of "musli" has not been made.—Phar. Jour. and Trans., July 10, 1880, p. 21.

IRIDACEÆ.

Saffron—Cultivation in Spain.—A writer in "Pharm. Handelsbl." makes some interesting observations relative to the culture of saffron in Spain. It is cultivated only in the provinces of Teruel, Cuenca, Ciudad Real, Toledo, Albacete, and Valencia. During favorable years the total yield amounts to about 200,000 ℔s.; the domestic consumption amounting to about 40,000 ℔s. Saffron requires a light, fresh and rather dry soil; prefers cool plains, and ceases to be productive after four years, when it becomes necessary to abandon the field and to select a new one, which has either lain fallow for years, or has been only covered by wild grasses and weeds. Up to within recent times, the cultivation of saffron was carried on by small tradesmen, who did not plant more than 20–40 Spanish bushels (fanegas) of bulk. Of late years, small farmers have begun to participate, who do not, however, plant more than 80 to 100 fanegas, because at the time of gathering the stigmata it is important to perform the whole labor within forty-eight hours at the latest. A skilled *rosera*—this is the appellation of a woman engaged in collecting saffron—cannot collect, even if working deep into the night, a whole pound of "roasted" saffron. One celemin of ground yields about 5 ℔s. of crude saffron, which, after roasting, diminishes to 1 ℔. The refuse matter is used as fodder for cattle, goats, and sheep, in whom it is said to produce a most abundant secretion of milk. There are three kinds of saffron known in Spanish trade, namely, *prima* or *escogida superior*, from Cuenca and Albacete; *secunda* or *media*, from Aragon and Teruel; and *tertia* (*baja-manzanares*), from Ciudad Real and Toledo. The city of Valencia is the chief emporium of the saffron-trade.—New Rem., August, 1880, p. 243.

Saffron—History, etc.—Some interesting historical notes are contributed by Charles B. Allen in a paper recently read at an evening meeting of the British Pharmaceutical Society. This, together with a paper by Mr. E. M. Holmes, in which he advises against the retention of saffron in some of the preparations of the Brit. Pharm., gave rise to considerable discussion, for which see "Pharm. Jour. and Trans.," December 4th, 1880, pp. 449–451 and 461–463.

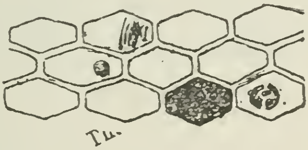
ORCHIDACEÆ.

Vanilla—Origin of the Commercial Supply.—Mr. J. Ch. Sawer, in view of the imperfect knowledge of the species and varieties of the vanilla plant, which has led to frequent controversy as to the origin of the vanilla found in commerce, has contributed the following résumé of the opinions of various authorities: Delteuil gives a list of the vanilla plants cultivated in various countries, from which it appears that in Mexico are found *V. planifolia* (yielding the finest fruit), *V. sativa*, *V. sylvestris*, and *V. pompona* (with short, thick fruit, called "vanillon"); Guiana and Surinam, *V. guyanensis;* Bahia, *V. palmarum;* Brazil and Peru, *V. aromatica* (which is the least aromatic of all); and at Réunion two sorts, which appear to be varieties of *V. planifolia*, the one usually called the small, the other the large vanilla, characterized by the stalk being thicker, the leaves much larger, the flowers larger and of a deeper yellow tint, the fruit thicker, shorter, and triangular; but this being of inferior aroma, its cultivation has been almost generally abandoned. In a paper recently communicated to the "Société d'Emulation," by Mr. Jaillet, on the "Culture and Preparation of Vanilla" (Rép. de Pharm., viii, p. 357), the author infers from the writings of various botanists on the subject, also from personal observation, that the *V. planifolia*, *V. sativa*, and *V. sylvestris* are identical, the distinctive specific characters not being clear and decided, but depending upon the effects of age, climate, and vigorous growth. He concludes that although there really exist several species of vanilla, and that there may be many varieties of the same species, all the commercial vanilla is furnished by *V. planifolia.* This would appear to be the opinion of the authors of the "Pharmacographia," as *V. planifolia* alone is mentioned as the commercial source, but perhaps referring only to the products of Mexico and Réunion. According to Bentley and Trimen ("Medicinal Plants"), there are several varieties of vanilla found in commerce, as Mexican or Vera Cruz, Bourbon, Mauritius, Java, La Guayra, Honduras, Brazilian, etc., the finest being the Mexican, of which there are different qualities. They further state that these varieties of vanilla are doubtless derived from different species of the plant. The finest, such as the Mexican, is commonly said to be the product of *V. planifolia* (Andrew), synonymous with *V. claviculata* (Swartz), *V. sylvestris?* and *V. sativa* (Schiede), *V. viridifolia* (Blume), and *Myrobroma fragrans* (Salisbury). Schiede, a writer on the botany of Mexico ("Botanische Berichte aus Mexico," 1820), considered the *V. sylvestris* as probably a synonym for *V. plani-*

folia, but Morren states that the exactness of that opinion is not clearly demonstrated. and declares that the writings of Blume, Swartz, Plumier, and Desvaux, merely render more difficult the question as to which species, varieties, and sorts are to be attributed the vanilla of commerce; also that this question could only be solved by an experienced naturalist, who should examine the plants in the localities where they actually grew, compare the different length, thickness, shape, color, flavor, and value of the fruit yielded by each species and variety, and accompany the diagnosis with drawings made on the spot. Mr. Jaillet's description of the culture, preparation, etc., of the vanilla in the different countries of its production accompanies the above, in Pharm. Jour. and Trans., March 19th, 1881, pp. 773–775.

Angræcum Fragrans — Microscopical Characters.—Dr. Heinrich Paschkis describes this drug—" Folia Faham," " Bourbon Tea "—as it occurs in French commerce. It consists of the well-preserved, entire leaves and leafy stalks. The leaves are yellow to yellowish-brown, softening like leather in water and very tough. When freshly obtained they have an agreeable, but not very strong smell, remotely resembling that of coumarin. They reach a length of over 7 cm. and a breadth of over 1. In form they are linear, rounded at the apex, and split up by shallow indentations into two unequal roundish points; at the base they attenuate only slightly and surround the petiole like a sheath. The parallel veins are somewhat more prominent on the under side than on the upper. When examined microscopically the epidermis of the upper side (Fig. 36) is found to be composed of very long hexagonal cells, which include no stomata between them. The contents of these cells consist either of very small light-refracting granules, or very brilliant drops and scales, or of delicate crystals, which appear as four-sided needles, or scales and tables. This cell contents is soluble in alcohol and ether, and runs together in potash solution to drops refracting light strongly. The epidermis cells of the under side are a little longer, and inclose between them numerous stomata margined by swelled, thickened guard-cells. In a transverse

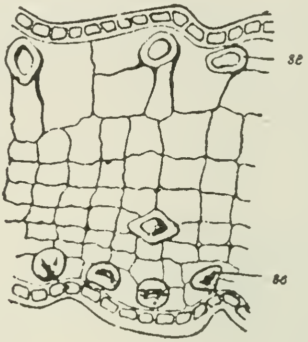
FIG. 36.



Angræcum Fragrans Epidermis (above).

section (Fig. 37) the epidermal contour appears to be slightly undulated. Next to the epidermal layer of this side, which is covered by a thick, yellow-brownish cuticle, follows the subepidermal layer (*se*, *se*) of very much thickened cells furnished with narrow lumens.

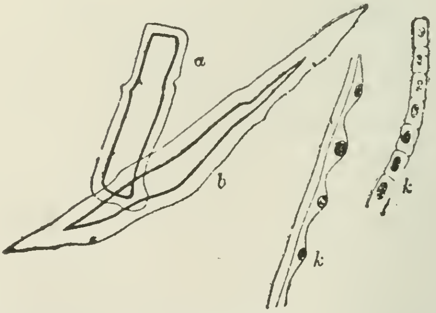
FIG. 37.



A. fragrans. Transverse section; *se*, subepidermal supporting-cell layer.

These cells, on the upper side, stand farther apart from each other, and are larger; on the under side they are closer to one another, smaller, thick-walled, and more or less circular. A similar cell occurs here and there in the mesophyll. The mesophyll consists of a wide-meshed tissue of oblong (under the upper side) to quadratic (on the under side) cells. In a longitudinal section, or softened in a macerated preparation, these supporting cells appear as more or less long, thick fibres, furnished with a small hollow (bast-like fibres, Fig. 38); those occurring in the mesophyll (*a*) are smaller and cylindrical; those at

FIG. 38.



A. fragrans. Separate supporting cells (bast-like fibres); *a*, from mesophyll; *b*, from margin; *k*, silica aggregations.

the margin (*b*) larger and spindle-shaped. They are not woody. There occur besides in the mesophyll crystal cells filled with raphides, which are somewhat larger than the other parenchyma cells, and somewhat elongated in the direction of the axis of the leaf. The vascular bundles show a prosenchyma consisting of netted porous cells, smaller (scalariform) and larger (spiral) vessels, which are accompanied by numerous bast-like fibres. There occur besides fibre-like series of cells (Fig. 38, *kk*), which at first sight appear to conceal in each cell a concretion of oxalate of lime, but which the author believes to be aggregations of silica, which have formed with great regularity in the cell-walls of this fibre-like series. In small depressions in the epidermis of the under side of Faham leaf occur glandules, which consist almost always of one stalk-cell and a bladder-shaped head; seen from the surface they appear like round brown spots about the size of the stomata. Their contents, when boiled with potash solution, are colored turmeric yellow. The exudation of the Faham leaves is of a light golden yellow color; it has an agreeable, slightly cinnamon-like odor, and a somewhat astringent taste.—Phar. Jour. Trans., May 7th, 1881, p. 913.

ARISTOLOCHIACEÆ.

Aristolochia Indica—Value as a Remedy for Snake-bite.—Mr. R. Modlen, referring to the South American remedy for snake-bites (see *Mikania Guaco*, under Compositæ), draws attention to *Aristolochia indica*, which appears to be an infallible remedy in the case of a human being bitten by the cobra. It is not a universal specific, however, since in the case of dogs bitten by the cobra the remedy seems rather to accelerate the action of the poison. The plant has been described by Mr. Dymock. (See Proceedings, 1877, p. 130.) Mr. R. Lowther, formerly commissioner at Allahabad, was accustomed to employ this plant very largely in cases of cobra-bites, and has communicated to Mr. Modlen details of several interesting cases. The leaves were bruised and applied to the wound, and were also reduced to a pulp, three medium-sized leaves being mixed with an ounce of water. The fresh leaf is, when tasted, very bitter and aromatic, bearing some resemblance to quinine in the clear, searching quality of the bitter. It is remarkable that when persons are suffering from the poison of the cobra they describe it as being sweet. Mr. Lowther always keeps a pestle and mortar by the plant, so that no time should be lost in bruising the leaf, and mixing it thoroughly with water before pouring it down the throat of the sufferer. The admixture of water is necessary, because in most cases the patient is insensible and the jaws stiffened so that the mouth needs to be opened forcibly, and the preparation poured down the throat.—Phar. Jour. Trans., November 20th, 1880, p. 411.

Asarum Canadense—Constituents.—Mr. F. B. Power, who undertook this investigation with a view of presenting his results as a thesis for obtaining the degree of Ph.D., at the University of Strassburg confined his studies chiefly to the volatile oil, obtained by distillation of the rhizome. *Asarum canadense*, L., presents but few prominent distinctions from the European species, *Asarum europæum*, and indeed, some botanists have considered them as simply varieties of one and the same species. The two plants may, however, be readily distinguished from each other. *A. canadense* is much more pubescent, the flowers of a brighter hue, and the rhizome usually attains a considerably larger size than the European species. The most important difference, however, between the two species seems to be in the nature of their chemical constituents: the rhizome of *A. europæum* possesses, according to several competent observers, acrid, emetic, and cathartic properties, and was considerably employed in Europe previous to the introduction of ipecac. On the other hand, the American species has been found to possess a mild, stimulating, diaphoretic action, producing nausea only in large doses. These differences in therapeutic action, however, may be possibly of degree, rather than of kind.

The chemical examination of the rhizome showed this to contain an aromatic volatile oil, starch, gum, a little resin and fat, amorphous yellow coloring matter (seems to be the "asarin" of Graeger), uncrystallizable sugar, a good deal of nitrates, small amounts of a body exhibiting alkaloidal reactions, but which is only a very feeble base, water and mineral constituents.

The volatile oil was found to consist of the following components: 1. A very small amount of a terpene $C_{10}H_{16}$, or *asarene*. 2. The acetic ether of an alcohol isomeric with borneol, and which may be designated as *asarol*. This is present in two modifications, differing considerably in their boiling-points and in their behavior toward polarized light. 3. Apparently a small amount of the valerianic ether of *asarol*. 4. An indifferent, neutral body, of undetermined constitution, and having the empirical formula $C_{12}H_{16}O_2$. This body, from its analogy with helenin, may properly be designated as *asarin*, but should then not be confounded with the so-called asarum-camphor, or other indefinite bodies, which have received the same name. 5. A small amount of a deeply blue-colored oil, the so-called *azulene* or *cærulene*. —From the Inaugural Thesis of the author *On the Constituents of Asarum Can.*, Strassburg, 1880; see Proc. A. Phar. Assoc., 1880, pp. 464–485.

MYRISTICEÆ.

Nutmegs—Description of several little-known Varieties.—Mr. J. Moeller gives a description of several varieties of nutmeg, which, though frequently mentioned, are comparatively unknown. These embrace: (1) *Myristica officinalis*, Mart.: longish, egg-shaped seeds, 25–27 mm. long, 14–16 broad, not unlike acorns in color and shape; odorless, somewhat resembling almonds in taste, without a trace of the spiciness of the true nutmeg, *Myristica moschata*, Thbg. (2) *Myristica sebifera*, Sw.: egg-shaped fruits, resembling bayberries in size and appearance, and having an odor and taste reminding of pepper or ginger rather than that of nutmeg. (3) *Myristica tomentosa*, Thbg.: egg-shaped seeds, 40 mm. long, and 20 mm. broad, resembling dates on superficial examination. In odor and taste it resembles the ordinary nutmeg. (4) *Myristica punctata*, Spruce: small, globular, deep brown-black seeds, about 14 mm. long by 10 mm. broad. It has neither odor nor distinctive taste. The very careful description of these several varieties, including their microscopic characters and accompanied by suitable illustrations, is too voluminous for abstraction. Other varieties of Myristica are briefly mentioned.—Phar. Centralh., December 16, 23, and 30, 1880, pp. 453, 465, and 473.

POLYGONACEÆ.

Rhubarb—Degeneration.—Mr. Hermann Werner, assuming that in the *Rheum palmatum*, var. *tanguticum* of Przewalsky, and the *Rheum officinale* of Baillon, we have two species that contribute largely to our supply of the officinal drug, draws attention to the degeneration of these plants in European climates and soil. The former plant, which, during the first years of its growth, corresponded accurately to the illustration given by Przewalsky, now, after five years, shows the gradual disappearance of the lobes. A specimen of *Rheum officinale*, Baillon, of undoubted origin, was planted by Dr. Goeppert of the Breslau Botanical Garden; the plant instead of developing five-lobed leaves produced entire leaves without lobes. Another specimen showed during the first year the five-lobed form of leaf and corresponded to the *R. officinale;* last summer, however, the lobes were already less distinct, and showed evidence of becoming obliterated. It seems probable from these observations that the European climate, possibly also the soil, is not suited for rhubarb culture.—Phar. Centralh., February 3, 1881, p. 56.

Rhubarb—Notice of Gigantic Species.—Col. Przewalsky reports, among other interesting observations during his recent travels from the neighborhood of Sining-fu to the sources of the Yellow River, the occurrence in this district of rhubarb—growing wild—of extraordinary development. Roots were found which weighed 26 pounds, being 16 inches long, 12 inches broad, and 7 inches thick.—New Rem., February, 1881, p. 51, from Jour. de St. Petersburg, October, 1880.

Rhubarb—Indian Species.—Mr. H. v. Schlagintweit remarks that the cultivation of rhubarb in India was hitherto unsuccessful, and that the so-called "India rhubarb" of commerce consists of roots cultivated in the neighboring districts of High Asia. There is as little of this in the market as of the Persian product, while the so-called "Turkey rhubarb" is supplied by the Chinese, and is considered the best root. The following species were noticed by the author on the India side of the Himalaya and in Thibet.

Rheum Emodi, Wallisch, a large plant, having a thick stem, growing from Bhutan and Sikkim to Kashmir, on the India side of the Himalaya, frequently reaching a height of more than six feet, and also indigenous to Western Thibet, but less abundant. In most districts of northeastern and central dry High Asia its efficacy is greatly praised, while in the damp and warm districts of Sikkim and Bhutan the root seems to be inefficacious. The whole sour stems are eaten both stewed and raw, while the leaves are dried and smoked in Thibet and in the Eastern Himalaya. *R. leucorrhizum*, Poll. (*R. tartaricum*, L.) grows plentifully in the dry districts. During the period of inflorescence it is usually two inches high, then gradually grows to the height of one foot. The root is said to be very efficacious, and the leaves are also smoked. Three other species—*R. Webbianum*, Royle; *R. Moorcroftianum*, Royle, and *R. spiciforme*, Royle—were met with less frequently.—Am. Jour. Phar., September, 1880, p. 448, from Zeitsch. d. Allg. Vest. Apoth. Ver., 1880, p. 70.

CHENOPODIACEÆ.

Beet Leaves—Oxalic Acid a Prominent Constituent.—According to the investigation of A. Müller, the fresh leaves of the sugar-beet contain 4 per cent. of oxalic acid, of which one-third is in the soluble form. As food for cattle, therefore, the leaves should be pickled with chalk, thereby forming insoluble oxalate of calcium.—Am. Jour. Pharm., December, 1880, p. 628; from Jour. Chem. Soc., October, 1880, p. 733.

SCROPHULARIACEÆ.

Folia Digitalis—Causes of Difference in Quality.—The causes which affect the quality of digitalis leaves have been the subject of controversy in "Pharm. Zeitg." (November, 1880), which is reviewed in "Pharm. Centralh." (November 11th, 1880, p. 404). The view that the locality of the growth of the plant is of influence, is only true with certain restrictions. Thus, for instance, it makes no difference whether the plant is collected in the north or in the south of Europe, provided always it is in mountainous regions. That growing in low, flat countries, however, or the cultivated plant, should be rejected.

The principal cause of difference is the period at which it may be collected. Good digitalis must be collected when the plant is in *full flower*, selecting only the large lower and root-leaves, and rejecting the middle and upper leaves. The midribs of the large leaves should be removed before using them. The least active are the leaves of first-year's plants which have not flowered; but if, as is the case in favored localities, the plant should flower during the first year, the leaves will attain their full strength. Unfortunately, herbalists, as a rule, collect the leaves indiscriminately, and hence the variation in the quality of the drug. The criterion for good leaves is found in the addition of tannic acid and of ferrocyanide of potassium to the infusion. A strong turbidity should be produced by the former at once, and by the latter after fifteen minutes. Young leaves, containing much inosit, pectin, and pectose, are evidenced also by the tendency of the infusion to gelatinize.

Digitalis Leaves—Admixture with the Leaves of Inula conyza.—Mr. Lapage draws attention to a falsification (admixture?) of digitalis leaves with those of *Inula conyza.* In the month of May, before the full development of the plants, the two plants are easily confounded by the more ignorant and careless herb-gatherers. The author gives the following characters of distinction: *Digitalis leaves* have an odor of their own, especially noticeable when they are crushed. They are ovate, *crenated*, downy, *whitish underneath*, and soft. A weak infusion (1 : 100), when treated with a few drops of ammonia, turns yellow, and after a time, orange-yellow. The leaves of *I. conyza*, although slightly tomentose underneath, have not the whitish appearance of digitalis. The odor is also absent, unless they have been mixed with digitalis. They are ovate, oblong, and *serrated;* their infusion, though nearly as bitter as digitalis, assumes, with ammonia, a green color, which becomes deeper and deeper on standing, and can still be noticed in an infusion of digitalis containing less than one-third of its weight of the adulterant.—Drug. Circ., November, 1880, p. 197.

Manacá—Components and Uses.—This Brazilian drug, which is derived from *Franciscea uniflora*, has been used by Goddy with success in the treatment of subacute sporadic spinal meningitis, accompanied by strumose cachexia. Egon has used it in rheumatism, and ascribes its action to its property of producing profuse perspiration. It is liable, however, to induce headache, which readily yields to the administration of coffee. The plant is a shrub, bearing short petioled, alternate, longish, acute leaves, and single, sessile flowers, having a penetrant odor. It is indigenous to equatorial America. The drug was analyzed by Erwin, and appears to consist of the stems of the plant, though the entire plant, and particularly the root, is said to be anti-syphilitic in its properties. The stems are tough, woody, yellow in the centre, with a dark and very thin outer bark. The fine powder has a yellowish-brown color, and an odor resembling corn- (rye-? Rep.) meal. It yielded to benzol 0.64 per cent.; to alcohol, 8.30 per cent.; to cold water, 2.72 per cent.; to sulphuric acid (dilute? Rep.), 46.27 per cent. (? Rep.); to soda (solution ?), 3.74 per cent.; and contained 38 02 per cent. of cellulose and ash. The dose of a fluid extract is 5 to 20 drops; of the powder, 8 to 20 grains.—Zeitschr. des Apoth. Ver., December 10th, 1880, p. 555; from Therap. Gazette, July and August, 1880.

SOLANACEÆ.

Indian Henbane—Uses, etc.—According to Professor W. Dymock the seed of the white henbane is exclusively used in native practice in India; it is known in Hindostan as "khorasani agwain," in Bombay as "khorasain owa," and in Madras as "khorasain oman." Among the uses to which it is put the following may be mentioned as peculiar to the East: A poultice of the juice with barley flour is used to relieve the pain of inflammatory swellings; the seeds in wine are applied to gouty enlargements, inflamed breasts, and swelled testicles. About ½ drachm of the seeds with 1 drachm of poppy seeds are made into a mixture with honey and water and given as an anodyne in cough, gout, etc. Equal parts of the seed and opium are used as a powerful narcotic. A mixture of the powdered seeds with pitch is used to stop hollow teeth which are painful, and also as a pessary in painful affections of the uterus. The juice or a strong infusion of the seeds is dropped into the eye to relieve pain. For the purpose of supplying government hospitals with extract and leaves of *Hyoscyamus niger*, this has been cultivated at Saharunpore in Bengal, at Hoonsoor in Mysore, and at Hewra in the Deccan. The experience of medical men in India is that the plant cultivated for government yields preparations in every respect equal to those obtained in Europe.—Phar. Jour. Trans., November 6th, 1880, p. 369.

Indian Henbane—Examination.—Mr. T. Greenish observes that the official biennial henbane leaf has of late years become very scarce in England. He has therefore welcomed the opportunity to examine a sample of henbane leaf sent from India by Dr. Dymock. It arrived in a tin box without any particulars as to its being the produce of the annual or biennial plant, place of growth, character of soil, the result of cultivation, or otherwise. On removal from the tin the leaves had a clammy feel; they possessed an intense odor, very persistent on the hand, and generally stronger than that of ordinary henbane. Dried at 80° F., it lost 7 per cent. The odor passed off almost entirely in the process of drying. A tincture prepared by maceration was a brown-olive, whereas the official tincture is olive-green, and the color more intense. A little added to water produced no opalescence, and gave only a tinge of color; the official tincture, on the contrary, produced considerable opacity, which disappeared on the addition of a little liquor potassæ. In the general structure of the leaf, the author found no very material difference. Extracts made from the two tinctures were relatively 3.43 for the Indian henbane, as compared with 4.20 for the British Pharmacopœia. The author thinks it might be worth while to make a tincture with the leaf without previously drying it, so that the strong odor, which is probably due to some volatile principle, and also the acridity, might be retained, and probably increase the therapeutic value of the product.—Chem. and Drug., September, 1880, p. 386, from Proc. Brit. Pharm. Conf.

Cayenne Pepper—Tasteless Article from Natal.—Mr. Thomas Greenish called the attention of the British Pharm. Conference to a sample of Cayenne pepper, recently introduced in London, which, though possessing all the external characters of Natal red pepper, was entirely devoid of pungency. The question arose, how had this sample been deprived of its pungency, so as still to retain its color.—Chem. and Drug., September, 1880, p. 387, from Proc. Brit. Phar. Conf., 1880.

Hungarian Red Pepper.—At the meeting above referred to Mr. H. B. Brady had occasion to mention the fact, that a sample of Cayenne might be a perfectly genuine powder of capsicum fruits and still possess relatively a very small degree of pungency. He named as an illustration the red pepper commonly met in some parts of Southern Europe, notably the

Paprika of the Hungarians. Inquiries since made have elicited the fact that *paprika* is prepared entirely from the fruits of *Capsicum annuum*, Linn., which is grown generally throughout Hungary. Of this species, however, there exist a great number of varieties, distinguished by the size and shape of the fruits, and their milder or sharper flavor. The larger fruits are as a rule comparatively mild, and have a sweetish taste of their own, whilst the small pointed sorts are commonly the more pungent. The degree of pungency as well as the particular flavor is said to depend in part upon locality, and in part also upon method of cultivation. The *Szegediner paprika* is the sort most esteemed by the Hungarians.—Phar. Jour. Trans., December 11th, 1880, p. 469.

Tobacco—Determination of Nicotia. —Mr. E. T. Pease has determined the alkaloid in leaf and manufactured tobacco by the volumetric method with potassium mercuric iodide, as directed in detail by Dragendorff. The reaction was sharply defined in each case. He found *cigars* to give a reaction corresponding to 2.0 per cent. nicotia;

Kentucky leaf tobacco, 4.05 per cent.; *Sweet Peach chewing*, manufactured, without much steaming, from same grade tobacco as previous, 3.24 per cent.; *filler* from real Havana tobacco cigar, 4.21 per cent.; *Havana seed leaf tobacco* (grown in this country from imported seed), 3.94 per cent.; *Gem cigarette tobacco*, Richmond, Va., 3.93 per cent. of nicotia. A short clay pipe, used for some time and partly colored, pulverized, and treated in the same manner as the above, gave indication of 2.02 per cent. alkaloid. A quantity of tobacco was consumed in an ordinary brier-root pipe and the smoke drawn through two flasks containing acidulated water. The water gave indications of alkaloid amounting to 2.48 per cent. of the dried tobacco burned. At present he is not assured, however, but that some of the empyreumatic products of the tobacco may react with Mayer's solution, and he therefore reports the last-named results with some reservation.—Am. Jour. Chem. Soc., July, 1880.

OLEACEÆ.

Olive Culture in California.—While many of the other species of fruit-trees in California have suffered from disease and yielded small crops this year, it is interesting to note that the olive is as thrifty as could be desired, and seems to be as well adapted to the climate of the Pacific coast as do the native oaks. The best-known varieties of olive-trees for oil are the *Le Caillet Olivier* or *Neustral*, which is largely cultivated in France, and the *Le Cayon*, which is the Hyères variety. These make the best quality of oil, though the *Verdale* is a large oil-producer. In France eleven departments cultivate the oil, devoting a total area of 303,072 acres to that use. The total product of this land in oil amounts to nearly $12,000,000. This is exclusive of the picked olives. In Italy, Greece, Spain, and Portugal, large areas are devoted to the olive, probably in the aggregate greater than that of France, but statistics on the subject are not as full as could be desired. The fact, however, which appears most prominent, is that most of the olive product of European countries is required for home consumption, and that only the lower grades of pickles and the adulterated oils reach our markets. The olive-groves of Europe are many of them century-old, and slowly wearing out.

A tree of ten years of age ought to give a gallon of olives; at thirty years, eleven gallons; and go on increasing until it yields thirty-eight gallons, and, in rare cases, even twice this amount. Good olives ought to give an eighth of their volume in oil,—that is, eight gallons of berries yield one gallon of oil. The yield varies, of course, with the variety; but this may be called a good average.

The olive grows faster here than in Europe, and bears earlier. At Niles, Alameda County, Cal., a six-year-old tree bore fully a gallon of fruit last year. At eight years good returns may be expected. The price obtained is also greater than in Europe, and this should easily offset the greater cost of labor. Our methods of cultivating the soil are much better. Besides this, the land used for olives in Europe is much of it exceeding rugged, and is like our steepest goat and sheep ranges. The foothills of our Coast Range and Sierra are in every respect more desirable, more easily worked, and will probably yield more per acre when the plantations have attained a sufficient age. It will thus be seen that we have every encouragement to plant this valuable tree. Australia has lately taken up the subject of olive culture, and the Government is taking an interest in promoting the work.—New Rem., May, 1881, p. 138.

Olives—Influence of Fermentation on the Yield and Quality of Oil.—Mr. Planchard has made sundry practical experiments on the yield of olive oil, the results of which incline him to the belief that the keeping of the olives together after gathering, in order to induce fermentation, and thereby to promote the yield of oil, is not a vulgar prejudice; but this fermentation should not be continued too long, else the yield will be diminished. He furthermore finds that the transformation of part of the pericarp into oil is due to the development of a mycoderm of the genus penicillium on the surface of the olive. The practice of placing the olives in heaps, directly after gathering, to induce fermentation, is very old, and may be said to be universal in the countries where this oil is produced.—New Rem., October, 1880, p. 293; from Chem. and Drug.

LABIATÆ.

Salvia pomifera.—Professor X. Landerer draws attention to the uses of this plant—the apple-bearing sage—in Greece. A tea is made from the herb and drunk in all chills and gripes, as a matter of course, without consulting the doctor; it is sold, too, in the coffee-houses and confectioners' shops. It is called "apple-bearing," because the punctures of the insect *Cynips salviæ* causes the growth of galls, known as "gallæ esculentæ," resembling little green apples. These little apples are collected and eaten, after being steeped in water to remove the bitter and styptic constituents. The plant is very common in the mountains of the district of Maina, and the galls are collected and boiled in honey or sugar, the conserve being used like other sweetmeats, or, mixed with water, as a beverage,—a teaspoonful to a tumbler. In Odessa, a kind of punch is made of the sage-plant, with rum.—Chem. and Drug., May, 1881, p. 215.

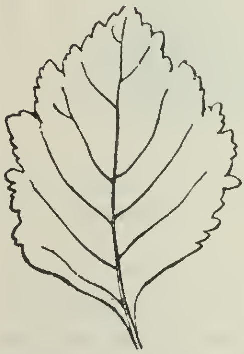
Eriodictyon Californicum—Proximate Examination.—Mr. William C. Holzhauer has determined, in the leaves of *Eriodictyon Californicum*, the presence of tannin, gum, sugar, wax, a caoutchouc-like resin, and a brittle amber-colored resin, having an aromatic, slightly bitter taste and odor.—Am. Jour. Pharm., August, 1880, pp. 404–406.

Patchouly—Source, Preparation of Oil, etc.—J. Ch. Sawer contributes some interesting notes on patchouly, from which the following is extracted: Apparently there are several varieties of *Pogostemon* that contribute to the supply of patchouly. The bales which now arrive in London are mostly from the province of Wellesley, where it grows wild; but it is cultivated at Singapore, and is found in Silhet, Penang, and the opposite shore of the Malay peninsula, and in Ceylon, China, Java, Mauritius, etc. Its native locality may not have so wide a range, but it has most likely been introduced for cultivation at many of those places. It is difficult to obtain accurate botanical descriptions of the plants producing patchouly, probably because, in common with all labiate plants, these are apt to take a character and habit not true to the original plant, when transplanted to a climate or soil other than is natural to them.

The method of cultivation of the plant and preparation of the oil, as practiced by Mr. Fisher, of Singapore, is as follows: The variety selected for cultivation is known locally as *Tilâm wangi* (meaning "fragrant"), obtained from the island of Rhio, near Singapore, in the Straits Settlements. The soil most suitable is a rather stiff clay, with only a small percentage of silica, and land of this description found near the coast (containing traces of marine deposits) is planted in rows about four or five feet apart. The plants are propagated by cuttings struck in the open air, which, until rooted, are sheltered from the sun by pieces of cocoa-nut shells. The harvest is made in dry weather and when the sun has drawn up the dew from the leaves; the tops and green parts of the plants are broken off by hand, rejecting all yellow or decayed leaves and all the woody stems. The selected parts are then dried in the shade, under large sheds (as the sun would draw out the perfume), and to insure evenness in drying, they are spread on bamboo racks, allowing the air to penetrate from beneath. During this process they are frequently turned over, and when so far dried as to leave just sufficient moisture to permit a slight fermentation, they are piled in heaps and allowed to heat gently; after this, they are again spread out and dried, but not to absolute dryness, and are immediately distilled. The addition of about 25 per cent. of the wild plant—*Tilâm outan*—is said to increase the fragrance of the distillate. The distillation is effected by passing steam, generated in a boiler apart, through the leaves in the stills. The pressure of steam is not allowed to rise above 30 tbs. The yield, under these conditions, is about ¼ ounce per pound of leaves; by high-pressure steam the yield would be greater, but more rank in quality. Operating on specimens of leaf recently imported into London, the author observed that at the commencement of the distillation a small portion of a pale-colored oil passes over, lighter than water, and of a more delicate aroma than the heavy oil; but the heavy oil was rank. The Singapore oil is sent to London in cases of twelve bottles, containing twenty-two ounces in each bottle, labelled with the manufacturer's name, and guaranteed by him to be pure. Obviously, such oil is more likely to be pure and of better quality than an oil distilled in England, France, or Germany from the baled leaves without reliable pedigree. The baled leaves are, as already stated, chiefly those of the wild plant, and they may or may not be without admixture of the leaves of any other plant. But even if so, the majority of the bales are reshipped to a German port, and the oil distilled from them is said to be often adulterated to the extent of even 60 per cent. with cheaper oils, mostly those of cedar and cubebs.—Pharm. Jour. and Trans., November 20th, 1880, p. 409.

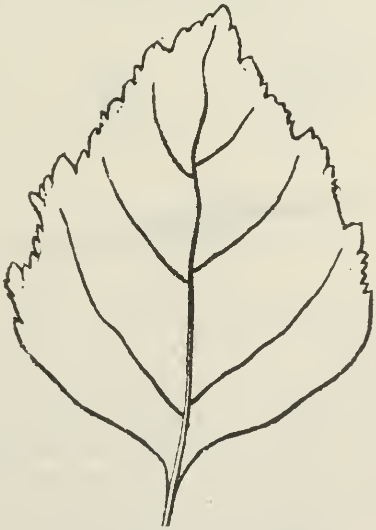
Patchouli Leaves—Characters of the True Leaves and of Certain, Adulterants.—Dr. Heinrich Paschkis describes the different leaf-forms found in original parcels of patchouly. The drug generally consists of leaves rolled together into larger or smaller balls, mostly of a dark red-brown color, and having an intensely disagreeable smell, remotely reminding of that of musk. Even in a superficial examination of the dried leaves considerable differences are observed in the leaf-balls taken from the same sample. Some are of a light wood-brown color,

FIG. 39.



Patchouli leaf, from nature, fresh.

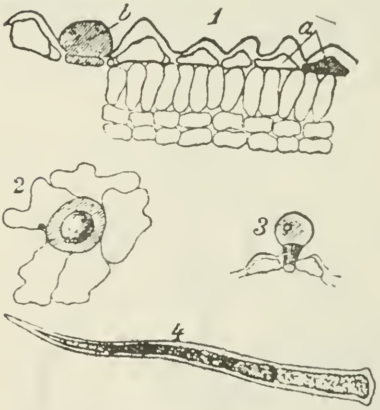
FIG. 40.



Patchouli leaf, from nature, dried.

others dark red-brown, others again greenish colored; some have sparse, others an abundant and even velvety pubescence. These differences become still more apparent when the balls are soaked for a time in water, and the leaves then carefully spread out and smoothed. Five forms of leaves have been observed: 1st. *True Patchouli Leaf* (Fig. 39, from nature, fresh; Fig. 40, from nature, dried). Broad, ovate, coarsely crenate, dentate leaves, ten centimeters long, diminishing at the base into a long petiole, light-brown, moderately thin, not very abundantly hairy on both sides, with one primitive nerve, and the secondary nerves forming curves running toward the margin. The microscopic examination (see Fig. 41) reveals in the epidermis of the upper and under side deeply indented, mostly elongated flat cells (1); among them, in greater number below and fewer above, are stomata, with a single contiguous cell. The epidermal cells of the upper side are coarsely papillose (1 *a*), here and there brownish colored. The cuticle is thick. The mesophyll consists of a row of palisade cells, below which is a layer of longitudinal elongated cells. Here and there are rosettes of oxalate of lime. The hairs (4) are simple throughout, several-celled (up to six); the cuticle of the hairs is warty, which is especially very clearly perceptible in the younger hairs. On the upper and under sides are numerous glands, one kind bearing a small head upon a short stalk (3), the other imbedded deeply in the epidermis and stalkless (2 and 1 *b*). In the former are drops of a greenish volatile oil, which occurs also in the hairs, as well as in the cells of the epidermis and the mesophyll. In the mesophyll, in the wall of the epidermis cells, and in the hairs, is a tannin substance,

FIG. 41.



Patchouli leaf.—1. Portion of section. *a*, papillose epidermal cells; *b*, large gland. 2. Large gland from surface. 3. Small gland. 4. Hair.

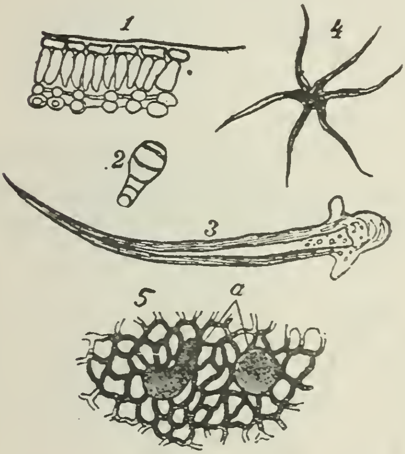
FIG. 42.

Second form.—False Patchouli.

giving a green color with iron. Except as to size, the author found leaves of *Pogostemon Patchouli*, from the Vienna Botanical Garden, exactly similar to this leaf; but they were only six centimeters long.

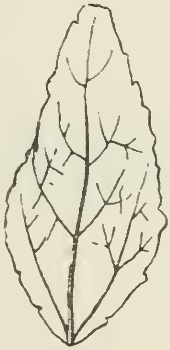
2d. *False Patchouli* (Fig. 42). Roundish, nearly transversely oval, 5-fid, dentate, 10 cm. broad and 8 cm. long, with radiate venation and cordate base. The leaf is dark-brown above and gray-green underneath; moderately hairy on both sides, somewhat more abundantly on the under side, rather thin, but thicker than the first form. The epidermis of the upper side consists of moderately regular polygonal cells with very few stomata (see Fig. 43, 1); those of the under side of indented, elongated flat cells, which inclose numerous stomata, without contiguous cells. In the mesophyll, consisting of a series of palisade and small transversely placed cells, occur round, bean-shaped or reniform mucilage cells (5 *a*) of considerable size; besides these, very large crystal glands are scattered there, especially in the neighborhood of the vessels, and smaller rosettes of oxalate of lime. On the upper and under sides, more abundantly on the under, are implanted small club-shaped glands (2), which are colored dark-brown by solution of potash. On both sides are also found *one-celled* hairs (3), *clustered in little bundles* of six to eight (4). These have a thick, striated cuticle, and contents that are colored nearly red-yellow with solution of potash.

FIG. 43.



1. Part of transverse section. 2. Gland. 3. Hair. 4. Stellate hairs. 5. Chlorophyll bearing tissue; *a*, mucilage cells.

FIG. 44.



Third form.—False Patchouli.

3d. *False Patchouli* (Fig. 44). Rhomboid obtuse leaves, with coarsely dentate margins and three radiating nerves, abundantly hairy on both sides, thick, of a brownish-gray color, attaining a length of 5 cm., and a breadth of 2.5 cm.

4th. *False Patchouli* (Fig. 45). Five-lobed sinuate leaves. The two lower lobes are small and round; the next pair are larger, also round, showing at the margin a second shallow sinus; the remaining and largest lobe is slightly crenate on both sides and acute. The margin of these leaves is also coarsely dentate, and drawn in acutely cordate at the base. The leaves are abundantly hairy on both sides, thick, brown above, green underneath, and attain a length of 7 cm., and a breadth of 5.5 cm.

FIG. 45.

Fourth form.—False Patchouli.

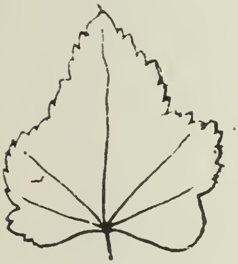
FIG. 46.

Fifth form.—False Patchouli.

5th. *False Patchouli* (Fig. 46). Palmate leaves, with five lobes separated by deep sinuses. Each of these is separated by a second somewhat shallower sinus into two smaller lobes; all run to a point. The margin is coarsely dentate, obcordate at the base. The color of this thinner leaf is brown above and gray-green underneath. Its length and breadth reach 10 cm.

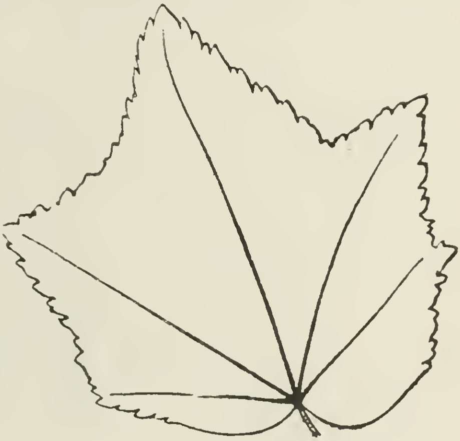
The two species last described (4th and 5th), have five radiating nerves. In their microscopic structure they correspond perfectly with each other, and are also only slightly different from the leaves of the second form. As compared with the second form, the epidermis both on the upper and under side of the fifth form is composed of more indented smaller flat cells, which on the upper side inclose among them fewer and on the under side more stomata without contiguous cells. In the mesophyll, consisting of a simple inferior palisade series and small roundish cells, are imbedded small rosettes of oxalate of lime. Above and underneath occur numerous club-shaped glandules, which turn brown with a solution of potash, corresponding to those of the second form. The hairs occur either separately, in which case they are very large, thick-walled, and have contents colored red-yellow by solution of potash, or in *clusters* of five to seven together, and are then smaller and have thinner walls. *All the hairs are single-celled.* No mucilage cells or tubes were found in these leaves.

FIG. 47.



Lavatera obia.

FIG. 48.

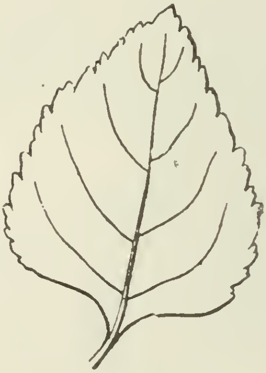


Pavonia Weldenii.

Only the leaves first described can be spoken of as true patchouli leaves; all the others must probably be considered as sophistications. The absence of glands containing essential oils and of the characteristic many-celled hairs distinguishes the latter clearly from true patchouli leaves, whilst all the false leaves present an almost similar macroscopic and microscopic structure. Probably they may all be considered as derived from one family, and the characters of the second form point to the Malvaceæ. In this connection the author draws attention to two Malvaceæ. *Lavatera obia*, the leaves of which (Fig. 47) resemble the fourth form, and *Pavonia Weldenii* (Fig. 48), which resemble the second form. The mixing of these false patchouli leaves in many cases goes so far that they form 80 per cent. of the drug. The leaves of the third and fourth forms were most frequently found; the second and fifth most seldom. Only on one occasion did the author meet with a pure sample consisting altogether of true patchouli leaves. Finally, the author draws attention to a Labiate,

Plectranthus Patchouli (Fig. 49), which, under the name of "patchouli herb," is frequently used by housewives in the same way as *Pogostemon* leaves in the protection of clothes and furs from moths. They have an odor resembling that of patchouli, and resemble the true leaves in respect to both their macroscopic and finer structure.—Phar. Jour. Trans., April 2, 1881, pp. 813–815.

FIG. 49.



Plectranthus fruticosus.

CONVOLVULACEÆ.

Jalap—Cultivation in India.—Mr. Jamieson gives some interesting details of the propagation and growth of jalap in the Ootacamund Gardens, India. Having no data to guide him regarding the climate and soil which are natural to the jalap plant, he tried a variety of situations, and now finds that it thrives best in a tolerably rich, dry, and friable loamy soil—in fact, conditions of soil that are indispensable to the production of good potatoes seem equally necessary to the growth of jalap. Good grass-land is preferable to open rich forest land; when planted in the latter, it has a greater tendency to produce a mass of succulent roots than to form tubers. In opening land for the cultivation of jalap, several acres of well-drained grass land, sheltered from the southwest winds, and with a stream of water on or near it, should be selected. If the land be very steep, it should be laid out in terraces ten feet wide. The terracing should be completed by the end of January, and the ground dug over to the depth of two feet and left exposed to the action of the sun until the beginning of April, when it should be drilled, manured, and planted with potatoes (an early ripening variety of kidney would be the best). The potatoes should be lifted in June, the land cleared of weeds and forked over, in order that the manure—not taken up by the potatoes—may be incorporated in the soil. The ground is now ready to receive the jalap plants, which should be planted, when the tubers are about the size of pigeon eggs, in rows across the terraces, the ridges a few inches higher than the general level of the ground, to prevent the water from lodging immediately around them. If the weather be dry the plants should be watered occasionally until they have begun to grow; when once established, ordinary garden culture as to weeding, etc., is all that is necessary. The twining stems should be supported by stakes in the same manner as ordinary garden peas are. The stems die annually, and the tubers remain dormant for two or three months. In addition to the aerial stems, jalap throws out a mass of underground shoots, which emit roots and form tubers at intervals of from six to nine inches. It is from these underground shoots that the greater proportion of plants at the above-named plantation have been raised. When cut about three inches long and planted, they root freely and gradually enlarge into tubers; by this means the plant can be multiplied to any extent. No regular season has yet been observed for collecting the tubers or method adopted for preparing the drug for use; but Mr. Jamieson has no doubt that it will be advantageous to dig them up when the herbaceous stems have died down and the tubers are dormant, which in the Nilgiris will be during the months of January and February. The results show the successful and profitable cultivation of jalap tubers, which, according to the chemical examination, are of good quality.—Chem. and Drug., May, 1881, p. 216.

APOCYNACEÆ.

Strychnos—Studies of the Genus.—Prof. G. Planchon has made comprehensive studies of the genus strychnos, both in relation to the characters of structure of the barks and woods of species of this genus, and to the application of the species in the production of the different curares.—See Phar. Jour. Trans., December 11 and 18, 1880, January 1 and 22, February 19, and March 12, 1881.

Curare—Sources in French Guiana.—In a letter to Mr. Leroy de Mericourt, Dr. J. Crévaux inclosed the photograph of a plant called, like its extract, *ourari*, and expresses the belief that in this we have

Fig. 50.

Strychnos Crevauxii.

the real poison, for the juice of the root, steeped in brandy, produced on various animals absolutely the same effects as the curare heretofore known. Dr. Crévaux, who explored the rivers "Yari" and "Paru," or "Parou," in 1876–77, and again in 1878–79, has witnessed the preparation of the "*ourari*" by the Indian tribes inhabiting the upper part of the "Yari" river region in French Guiana. The poison is principally derived from the juice extracted from the root of the *ourari* plant. To this extract are added the juices of other plants that have no poisonous properties (as was proved by experiments on men and animals). To prepare the poison, the Indians soak the root, remove the bark with a knife, and press out the juice with their hands. This juice, with the addition of other unimportant ingredients (pepper among others), is very gently heated and dried in the sun. The juice of the root is very bitter, and stains the hands brown like tincture of iodine; it can be handled with impunity, provided one has no scratches.

The plant has been determined to be a new kind of *strychnos*, to which the name of

Strychnos Crevauxii has been given. It is a climber, growing to the height of forty or forty-five meters. The trunk bears numerous branches (Fig. 50), provided, at intervals, with spirally twisted tendrils, thickened somewhat at their ends. The smaller branches are covered with short yellow hairs. The leaves, of moderate thickness, coriaceous, are from five to eight centimeters long, elliptical, lanceolate, short taper-pointed, generally provided with a short petiole of four or five millimeters. The upper surface is glabrous and shining; the lower, dull, also glabrous, except the stronger veins, which have hairs sparsely attached. From the lower end of the middle vein two well-defined small veins arise and follow the edges, and at a certain height two others, more strongly marked, curve toward the point. The inflorescence (Fig. 51) is axillary, much shorter than the leaves, with opposite bracts, carrying small pedicelled flowers. The flowers (Figs. 52 and 53) have a calyx with five lanceolate sepals, a funnel-shaped corolla, much longer than the calyx, forming five petals, which are turned backwards and outwards, and are covered on their internal surface with whitish hairs; five stamens with adnate anthers. The ovule is globular, surmounted by a long style, slightly dilated, and bilobed at the top.

FIG. 51.

Inflorescence.

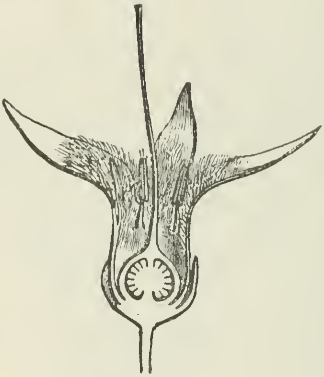
One rather curious peculiarity of this species is the existence of small branchlets, more or less forked, very slender, which often appear at the axis of the leaves. The stem of these branchlets, as well as the small opposite leaflets, which are but two or three millimeters long, are covered with little curved hairs.

After a description of the root and stem, parts of which were sent with the plant, Mr. Planchon, who communicates the above, reviews the various curares, as follows:

So far as our present knowledge extends, there are four different sections of Northern South America where curare is prepared, and in each of these sections a different kind of *Strychnos* is used as the source of the poison. These four sections, from west to east, are the following:

1. The region of the Upper Amazon, the largest of all. comprising the rivers Solimoens, Javiri, Iça, and Yapura. It furnishes the curare of the Ticunas, Pebas, Yaguas, and Oregones. This is prepared from *Strychnos Castelnæana*, Wedd.

FIG. 52.



Section of Flower.

FIG. 53.

Flower.

2. The region of the Upper Orinoco to the Rio Negro. This contains the district visited by Humboldt in 1800. It furnishes the curare of the Maquiritaras and Piaroas, which is derived from *Strychnos Gubleri*.

3. The region of British Guiana, furnishing the curare of the Macusis, Orecumas, and Wapisianas. This is derived from *Strychnos toxifera*, Schomb., including *Str. Schomburgkii*, Kl., and *Str. cogens*, Benth.

4. The region of Upper French Guiana (Upper Paru) furnishing the curare of the Trios and Roucouyennes, which is derived from *Str. Crevauxii*, Baill., described above.—New Rem., January, 1881, pp. 1–3, from Jour. de Phar. et de Chim., July, 1880.

Mr. Montague Flint gives an account of the circumstances attending the preparation of "urare" or "wourali" by the Macusis of the Canuca Mountains, which, extracted from the "Lancet," will be found in the same number of "New Rem." (p. 3). The author's description differs considerably from that given by others.

Nerium Odorum—Constituents.—No attempt having as yet been made to isolate the active principle of the sweet-scented oleander, much cultivated in India for the sake of its flowers, and where its poisonous properties are well-known, Mr. Henry G. Greenish has subjected the root to chemical examination. It consisted of pieces, varying in thickness of a goose-quill to over an inch in diameter, the majority three-eighths to five-eighths of an inch. Externally, the bark presents a grayish, wrinkled appearance. On removing the outer layer, the inner is seen to be yellowish green in color. The wood is soft, easily cut, and possesses the same yellowish-gray color as the bark. The latter, which is of medium thickness, and adheres tolerably firmly to the wood, is remarkable for its intensely bitter taste, which in the wood is hardly noticeable. Under the microscope, a transverse section showed the bark to be composed of an external layer of about ten rows of cork cells, followed by parenchymatous tissue, traversed longitudinally by numerous laticiferous vessels, still containing in many instances the dried latex. On the longitudinal section, the course of the laticiferous vessels may be easily traced, especially after treatment of the section with iodine and chloride of zinc. By this means the parenchymatous cells are colored blue, whilst the dried latex absorbs iodine and renders itself so more evident by its yellow color. Bast fibres are not present. Between the wood and bark is seen the cambium layer with its thin-walled cells. The wood consists of the usual elements, viz., wood-cells and vessels. They are somewhat thin-walled and of small diameter. Single rows of narrow parenchymatous cells (medullary rays), loaded with starch-grains, traverse the wood from the centre to the circumference. The absence of pith shows the drug to be a root. By treatment of the longitudinal section with iodine and chloride of zinc, numerous sieve-cells in the inner bark are brought to light, which otherwise easily escape observation. Crystals of oxalate of calcium are numerous. Both the bark and the wood contain two glucosides, named by the author

Neriodorin and *neriodorëin* respectively. *Neriodorëin* was obtained in the form of a pale yellow, amorphous powder, having an intensely bitter taste, followed by a numbing sensation lasting a considerable time. It is insoluble in petroleum spirit, ether, benzol, chloroform, bisulphide of carbon, amylic alcohol, and acetic ether, both warm and cold, but is easily soluble in both cold water and alcohol. The aqueous solution possesses a neutral reaction. It contains no nitrogen, and when burnt on platinum leaves only a trace of ash. *Neriodorin* was obtained in the form of a clear, yellow, tenacious, varnish-like mass, which, after long standing over sulphuric acid, was not brittle enough to allow of its being powdered. It was easily soluble in chloroform, very difficultly in cold water, more easily in boiling water, imparting to both hot and cold water its intensely bitter taste. Petroleum spirit, benzol, and bisulphide of carbon did not dissolve it; ether dissolved only traces. In alcohol it was tolerably readily soluble.

Both principles, when heated with 2 per cent. hydrochloric acid, are converted into resin-like bodies, and the aqueous filtrate contains glucose. When heated with lime-water and evaporated to dryness, they lose their bitter taste. Both possess the character of powerful cardiac poisons, and will be the subject of further investigation.—Pharm. Jour. and Trans., April 23d, 1881, pp. 873–875.

Quebracho-Bark—Identification.—Mr. G. Fraude communicates the following method for recognizing true Quebracho-bark (from *Aspidosperma Quebracho*). Boil 5 grams of the finely cut bark with about 25 cc. of coal-tar benzin of very low boiling-point, for about five minutes, filter hot, and shake the scarcely colored filtrate with about 10 cc. of dilute sulphuric acid. The aqueous solution, containing sulphate of aspidospermin, after being separated from the benzin, is treated with ammonia in excess, and shaken with 10 cc. of ether. The ethereal solution is evaporated in a test-tube and the residue boiled with perchloric acid. In case the latter is not at hand, a little water and 3 or 4 drops of sulphuric acid are added to the residue, then a *very* minute quantity of chlorate of potassium, and the whole boiled. In either case a handsome intense fuchsin-like coloration will ensue, which is characteristic of the alkaloid (aspidospermin) contained in the bark.—From Ber. d. Deutsch. Chem. Gaz., 1881, p. 319; in New Rem., June, 1881, p. 184.

SAPOTACEÆ.

Gutta percha—Purification.—The following method is given in the "Chem. Zeitg." (No. 3, 1880): The gutta-percha is dissolved in boiling benzol and treated with finely-levigated gypsum. This carries down all the impurities. The decanted liquid is then mixed with twice its volume of 90 per cent. alcohol, observing to stir continuously during the addition, whereby the gutta-percha is precipitated as a perfectly white gelatinous mass. This is dried by prolonged exposure to the air.—Phar. Centralh., February 17, 1881, p. 85.

STYRACEÆ.

Alstonia constricta (Australian Alstonia Bark)—*Alkaloidal Constituents.*—O. Hesse has made a re-examination of this bark, and has separated and described three alkaloidal constituents, viz., *alstonina* (syn. *chlorogenia*), *porphyrina*, and *alstonidina*.

Alstonina, freshly precipitated, is readily soluble in chloroform, but less readily when previously dried; it dissolves also readily in alcohol, but sparingly in ether, particularly in the dried form. Its hydrate (containing 3½ H_2O), melts below 100°, while the anhydrous alkaloid ($C_{21}H_{20}N_2O_4$), melts near 195° C. (uncorr.). It is, in opposition to the statements of Palm (1863), a strong base, and forms salts with the acids, of which the sulphate, hydrochlorate, tartrate, and oxalate are readily soluble in water, but an excess of these acids precipitates the salts as brown flocculent masses The same behavior as these acids is shown by an acid constituent of the Australian alstonia bark, which is obtained in brown amorphous flakes, and which forms with alstonina an indifferent, difficultly soluble compound, and Mr. Hesse considers it very probable that Palm's alstonin consists of this compound.

Porphyrina forms a white amorphous mass, and yields a white powder. It dissolves readily in ether, alcohol, and chloroform, and is again obtained by the evaporation of these solutions in an amorphous condition. Its alcoholic solution, when diluted with much water, shows feeble blue fluorescence. Its composition is $C_{21}H_{25}N_3O_2$. and it melts, when dried in the exiccator, at 99° C. (uncorr.). The kilogram of the bark yielded only about 0.6 grams of this alkaloid.

Alstonidina was obtained in colorless, concentrically grouped needles. It is readily dissolved by chloroform, ether, strong alcohol, and acetone, and crystallizes on the evaporation of these solvents. Hot diluted alcohol also dissolves it readily. Its alcoholic solution has a feeble alkaline reaction and an intensely bitter taste; it shows a blue fluorescence, which, upon dilution with water, increases in intensity. Alstonidina melts at 181° C. (uncorr.). It forms salts, some of which crystallize very readily. The *sulphate* forms colorless needles very readily from hot aqueous solution; the *hydrochlorate* crystallizes in magnificent long needles, which are readily dissolved by water and alcohol; the *hydriodate*. *sulphocyanate*, and *mercurochloride* are also crystalline, while the *platinum* and *gold salts* appear to be amorphous. This alkaloid resembles Oberlin and Schlagdenhauffen's *alstonina* (see "Proceedings," 1879, p. 175), but is nevertheless decidedly different therefrom.

The alkaloids above described do not comprise all which are present in Australian alstonia bark. At one time the author obtained small scarlet-red needles, which proved to be the sulphate of a new alkaloid, but could not be further examined for want of material.—Am. Jour. Phar., March, 1881, pp. 113–118, from Liebig's Annalen, 205, pp. 360–371.

GENTIANACEÆ.

Frasera Walteri—Constituents.—Mr. G. W. Kennedy has had opportunity to examine two samples of a yellow—evidently crystalline—powdery substance, which Prof. J. U. Lloyd had obtained at different times from the root of *Frasera Walteri*, and which had been submitted for his examination by the latter in the belief that the substance might prove to be identical with the yellow acid (gentisic acid) obtained by Mr. Kennedy from the same plant in 1873 (see "Proceedings," 1873, p. 636). The present examination proves the complete identity of the two substances, and further corroborates the previously expressed view, that the root of the American colombo contains constituents identical with those of *Gentiana lutea*, and that the two roots are closely analogous; the only difference being that the Frasera contains more of the gentisic acid, and the gentian more of the bitter principle (gentio-picrin). Mr. Kennedy, furthermore, believes that it is the gentisic acid which, with ferric chloride and with solution of gelatin, gives the reactions that have led a number of experimenters to believe that gentian root contains tannic acid. The substance was found to be decidedly more soluble in hot water than cold; the former producing a pronounced lemon-yellow solution, while in the latter the water was hardly tinged.—Am. Jour. Phar., June, 1881, p. 280.

COMPOSITÆ.

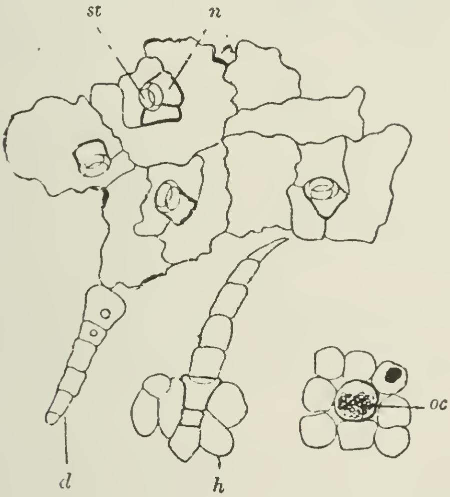
Eupatorium Perfoliatum—Proximate Constituents.—Mr. George Latin has obtained from the leaves and tops of the plant, besides volatile oil, gum, tannic acid, and sugar, a crystallizable glucoside, which he names

Eupatorin.—This is bitter and a little acid to the taste, soluble in alcohol, chloroform, ether, boiling water, and concentrated acids, and wholly dissipated by heat. When boiled with sulphuric acid and water the odor of raspberries is given off.

The volatile oil, which was obtained in small quantity, by distillation, has the disagreeable odor of boiled cabbage.—Am. Jour. Phar., August, 1880, p. 392.

Eupatorium Ayapana, Vent.—*Microscopical Characters.*—Dr. Heinrich Paschkis describes the microscopical characters of leaves of this plant, which occurs in tropical America, the East and West Indies, the Mauritius, and Java. They were greenish-yellow to reddish colored, well preserved leaves and leafy stalks, having an agreeable odor. The leaves are lanceolate, but gradually acuminate, and diminish slowly at the base into the short petiole; they are of the thickness of paper. Under a magnifying glass or lens they appear hairy, with fine hairs, somewhat more so on the under than on the upper side. They attain a length of nine centimeters and a breadth of two. The lowest two lateral nerves spring at a very acute angle from the principal nerve, and each anastomoses in the form of a noose not far from the margin. The finer structure of the leaf is very simple. The epidermis of the upper side consists of polygonal flat cells, which inclose only a few almost circular stomata, occurring only in the immediate neighborhood of the nerves. The epidermis cells of the under side (Fig. 54) are larger than those of the upper side, and are either about equal in length and breadth, or are elongated in the direction of the axis of the leaf; but all are nearly double as high as the epidermis cells of the upper side. Upon the under side occur numerous stomata (*st*), which, with the guard cells, appear almost circular, and are provided with one or two contiguous cells (*n*), scarcely larger than the guard cell. Upon the upper and under side are implanted numerous hairs, which are always several celled. These appear either as ordinary pointed hairs (*h*) or as glandular hairs (*d*), provided with club-shaped heads. All the hairs contain a granular yellow substance, but the former contain besides strongly refracting drops (essential oil (*oc*)). The mesophyll consists of several layers (7 to 8) of isodiametric roundish cells, in which also, here and there, a small drop of oil is to be found. Only occasionally is a cell met with in the mesophyll filled with a granular strongly refracting mass, which oil-cell is not distinguished from the others either in size or form.—Phar. Jour. Trans., June 4, 1881, p. 1005.

FIG. 54.



Eupatorium Ayapana, under side.—*st*, stoma; *n*, contiguous cells; *d*, glandular hair; *h*, hair; *oc*, oil cell.

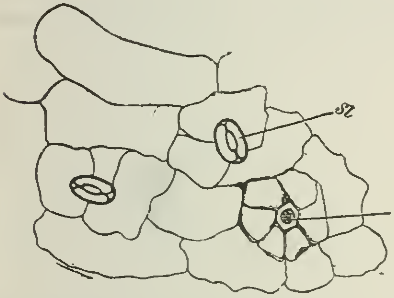
Mikania Guaco—A Remedy for Snake-bite.—Mr. Robert B. White, of La Salada, New Grenada, gives his personal testimony as to the value of *Mikania guaco* as a remedy against snake-bites. Mr. White says that this plant is the true "guaco," and that it forms the basis of all the preparations of the snake-bite doctors of the district. There are two varieties, one with green stems, the other, called "morade," with purple, the latter being the most prized. Mr. White, who has lived in the Choco and other snake-infested regions many years, testifies that the guaco, properly and promptly administered, is a cure for the bite of the most venomous infesting that country. When the guaco can be obtained fresh an infusion in sugar-water is made, in the proportion of one leaf to a large cupful, and this quantity is given hot every hour. It is said to stop the vomiting usually occurring. The leaves are also preserved by bruising and placing them in alcohol, and of this tincture thus formed a teaspoonful is administered every half hour for one hour and a half, and then every hour, and afterwards the dose is gradually diminished. Hot poultices of the bruised leaves and stem of the plant are applied to the wound, taking care not to use sufficient heat to drive off the volatile principle of the plant. If there be swelling and pain, the limb is fomented in the hot water, to which some tincture of guaco has been added. It is worthy of note that the plant was at one time said to be the source of Condurango.—Phar. Jour. Trans., November 6, 1880, p. 369.

J. G. Baker draws attention to the fact that this plant, which is widely diffused in tropical America, is known under a great many different botanical names. It is the *Eupatorium amarum* of Vahl; *E. parviflorum* of Aublet's "Guiana," tab. 315; *E. vincæfolium* of Lamarck, in the French "Encyclopédie;" *Mikania amara* of Willdenow and De Candolle; *Mikania Huaco* of De Rieux; *M. argyrostigma* of Miguel's "Stirpes Surinamenses," tab. 55; and *M. Guaco* and *Taffallana* of H. B. K. and De Candolle. It ranges from Panama and Nicaragua to Peru and Central Brazil.—Phar. Jour. Trans., December 11, 1880, p. 471.

Achillea Moschata—Uses, Components, etc.—This little alpine plant, growing in Switzerland at an elevation of 1500 to 3400 meters, has again been brought to notice by Bernhard, who prepares from it a tincture, a wine, and several liquors. It has long enjoyed a popular reputation as a nervine tonic and febrifuge. It resembles in its external character ordinary milfoil, but, like all alpine plants, it is very minute in its proportions. The odor resembles that of musk, whence its botanical designation. Examined by Von Planta, it was found to contain: 1. A peculiar volatile oil, *Ivaol* (*Iva* being the popular name of the plant), which is faint yellow, has a pleasant aromatic odor, and a bitter, warming taste, reminding of peppermint. Its composition is $C_{24}H_{40}O_2$. 2. *Ivain*, $C_{24}H_{42}O_3$, differing from the above by H_2O, which constitutes a yellow mass, insoluble in water, soluble in alcohol, and communicating to the latter an extremely bitter taste. Its odor is peculiar. 3. *Achillein*, $C_{20}H_{38}N_2O_{15}$, a glucoside identical with that found in *Achillea millefolium.* 4. *Moschatin*, $C_{21}H_{27}NO_7$, having an aromatic bitter taste, scarcely soluble in water, but soluble in alcohol and in liquids containing achillein. Finally Von Planta also found stearic acid in the plant.—Pharm. Centralh., October 28, 1880, p. 392, and Arch. der Pharm., July, 1880, p. 59.

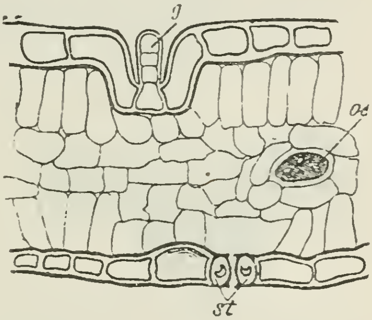
Liatris Odoratissima—Microscopical Structure of the Leaves.—Dr. Heinrich Paschkis, after describing the leaves, gives the following microscopic characters: The epidermis of the upper side (Fig. 55), consist of almost polygonal, only slightly indented flat cells; those of the under side are rather more indented. Some among the epidermis cells appear to be double the length and the same breadth. In the epidermis of the upper and under side occur very numerous stomata (*st*). Besides these there occur in the epidermis numerous yellow points, which are very elegantly and symmetrically surrounded by somewhat smaller cells; these are the glands (*d*), which will be referred to farther on, seen from above. The epidermis cells themselves appear finely striated. A transverse section (Fig. 56) shows the very regular structure as follows: Under the thick cuticle lie the epidermal cells, of which the above-mentioned large ones are disposed irregularly among the others. Then follows on both sides a layer of palisade cells, only somewhat less densely arrayed on the under side, and finally, several layers of almost rectangular cells. Distributed irregularly in the mesophyll occur roundish or oblong cavities (*oe*), which are filled with a greenish to golden yellow homogeneous substance (oil), in which separate, smaller, stronger refracting drops are inclosed. Smaller and larger drops of greenish essential oil and prismatic or six-sided tabular crystals of coumarin occur in the cells of the mesophyll and upon the epidermis. The epidermis of the upper as well as the under side is in many places indented with funnel

FIG. 55.



Liatris odoratissima.—Epidermis. *d*, gland; *st.* stoma.

FIG. 56.

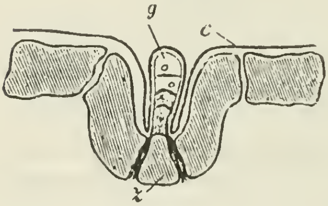


L. odoratissima. Transverse section. *g*, gland; *oe*, oil space; *st*, stoma.

shaped depressions (Fig. 57). In these glands (g) are sunk in the following manner: The stalk-cell (z) is wedged in, like the keystone of an arch, between the epidermis cells lying next to it; the head of the gland is divided by two, three, or more transverse walls. The delicate cuticle (c) turns up before reaching the stalk-cell and passes over the head. In this occur as contents molecular granules and small drops of essential oil. Similar substances occur outside the gland in the depressions of the cuticle. The head of the gland lies below the level of the epidermis. In other places the walls of the glandules are less or scarcely perceptible (Fig. 58), the whole having broken up into a coarse granular (crystalline?) detritus, which is not soluble in ether, alcohol, etc., as is the case with the contents of the unbroken gland.

250 grams of the leaves, when subjected to repeated distillation with water, yielded about 10 drops of a green essential oil, having a very strong, agreeable smell. This dissolved in ether, chloroform, and absolute alcohol, and upon evaporation separated again in a liquid non-crystalline form.—Phar. Jour. Trans., June 4, 1881, p. 1004.

FIG. 57.



L. odoratissima,—g. gland; c, cuticle; z, stalk-cell.

FIG. 58.

L. odoratissima.—Gland with transverse walls broken down.

Actinomeris helianthoides—Medicinal Uses.—The root of this plant is from the size of a knitting-needle to that of a quill, and contains an oil, and perhaps a resin, giving it the taste and somewhat the smell of turpentine. It has long been used by the people of Upper Georgia in dropsy, under the name of "diabetes weed." Dr. D. G. M. Goss says that he has used it in several obstinate cases of dropsy, and in several cases of cystitis with fine effect; also in calculous affections, and in chronic inflammation of the entire urinary tract. He gives it in the form of a tincture, one or two drachms to a dose, as a diuretic, or as an infusion, in doses of one-half to one ounce, repeated every hour or two. It may be tinctured in sweet spirit of nitre, eight to sixteen ounces of nitre.—Am. Jour. Phar., February, 1881, p. 85, and New York Med. Jour., from Med. Times, November 20th, 1880.

VALERIANACEÆ.

Valerian—Sium longifolium, an admixture.—C. Bernbeck draws attention to an admixture of the poisonous roots of Sium longifolium (a variety of S. latifolium which has lately made its appearance in the bottom land of the Upper Rhine), with those of Valeriana officinalis. The false rhizomes, when dried, resemble the true valerian very closely. They are, however, much lighter in weight, and the rootlets are not so pithy, and are less horny and more wrinkled in appearance.—Arch. d. Phar., December, 1880, p. 431.

RUBIACEÆ.

Cinchona—Cultivation in Bengal.—According to the report of the Government cinchona plantation in British Sikkim for the year 1879–80, it appears that the season was unusually favorable for planting operations, and that about three-quarters of a million of young trees were planted out, of which 644,222 were *Succirubra*, covering an area of a little over 196 acres, against 353,415 planted over an area of 120 acres in the previous year. During the year 276,700 trees of this species were put out in the new plantation of Sittong, covering an area of nearly 101 acres; 258,620 were planted on the old plantation of Rishap and Mungpoo, though on virgin soil, and 108,900 replaced those that had to be uprooted for the bark crop. In addition to these, a good many young plants were utilized in filling up gaps as they occurred in the older parts of the plantation. Dr. King, in view of the more extensive cultivation of *Cinchona Calisaya*, visited the plantations in Java. His report to the Government of India shows that, in respect to soil and climate, the Java plantations have great advantages over those of Sikkim; but, on the other hand, labor is much cheaper in British Sikkim. The conclusions arrived at by Dr. King were, that efforts should be made to graft *Ledgeriana* and approved varieties of *Calisaya* on *Succirubra* stocks; that attention should be directed towards propagating the best varieties of *Calisaya;* that trial should be given to the Java plan of shaving the bark of cinchona trees; and that a more suitable locality for cinchona cultivation than Sikkim should be sought for in Burma, the Andaman Islands, and the Khasi Hills. The Dutch method of shaving the bark of living trees has already been tried at Mungpoo, but there has been as yet no time to judge of the results. The entire produce of the plantations for the year was 361,590 pounds of dry bark against 261,659 pounds in 1878–79; of this 29,520 pounds were yellow and the rest red bark. The plantation at Sittong grew its first crop during the year, 15,850 pounds representing the yield of that plantation. The aggregate yield of bark in former years amounted to 1,134,901 pounds, so that the total produce since their opening, including the crop of the past year, has been 1,496,491 pounds. The superintendent reports that there is a considerable demand for seed of *C. succirubra* among the coffee-planters of Ceylon, who sow it broadcast between the trees on their plantations, as also for seed of *C. Calisaya;* but it has been found impossible to meet the demand for the seed of the latter variety to the full extent, as the bulk is required for the Government plantation. The total out-turn of the febrifuge factory for the year just passed was 9434 pounds 13 ounces against 7007 pounds in the previous year. The demand of that year, however, amounted to 7955 pounds 7 ounces, which Mr. Wood, quinologist, was able to meet from the large stock that he had on hand at the commencement of the year. The febrifuge factory has been extended during the year.—Phar. Jour. Trans., October 23, 1880, p. 334.

Cinchona—Cultivation in Bolivia.—An interesting account of the renewal of the Bolivian cinchona forests is given in the report of the consul of the Netherlands at La Paz, in Bolivia. This may be regarded as the greatest factor of progress upon the domain of agriculture in Bolivia, the first impulse to which, however, did not emanate from the Government, but from private individuals and land-owners in 1878. The continued high prices of bark, as well as the reports on the cultivation of cinchona in India, have at last aroused a spirit of speculation, which is at its fullest development on the banks of the Mapiri, in the province of Larecaya, department of La Paz, where already some 400,000 to 500,000 new trees of a two years' growth may be found. In the province of Yungas, near Coroico Coripate, as well as on the river Casones, new plantations are springing up. An extensive valley, named Quinuni Valley, upon which great numbers of shoots and young trees are still found among the decayed stumps of old trees, has been purchased by private individuals, who propose to close it against access for a few years, so that the young trees may have a chance to grow.

The plantations are of two kinds, either upon private grounds (*haciendas*) or upon Government grounds (*terrenos baldios*). All the districts named above, with the exception of the Quinuni Valley and the land along the rivers Mapiri and Casones, have been owned by private persons and have been divided into haciendas. On such replanting is done at a trifling expense. In the wild and uncultivated tracts of land along the Mapiri, however, such an undertaking requires more capital and labor. The planting of such districts is contracted out to natives of the lower classes, who generally demand advances and sublet the real labor to Indians. The ground is usually covered by a dense forest, which is cut down in suitable sections; the stems, branches, shrubs, etc., are piled together, and, as soon as they have dried sufficiently, are set on fire. This operation is called *la rozada* ("razing"). During this time a nursery-plot, exposed to the free air, but situated in a shady place, is prepared. and the seed deposited therein. As soon as the young plants are about one foot high they are ready for transplantation. The "razed" district, called *rozadero*, is once more cleared of weeds, and the young plants put into the ground in distances of five to six feet. Between them are planted banana trees, which are intended to afford shade to the young trees during the first and second year. After this, the contractor sends his Indian workmen around occasionally to weed out between the trees. From March to June is the best time to begin a plantation, as the rainy reason is then over. One year after planting, the plantation is delivered over to the owner; all dead trees being taken out, and those which have retained vitality are counted. The contractor receives for each tree of one year's growth two reals or about fourteen cents. According to this rate the plantation at the Mapiri will have cost *about* as follows:

Ground,	$1,200
3,000,000 plants, each at $0.14,	42,000
Superintendent, buildings, etc.,	4,400
Interest,	4,800
Total,	$52,400

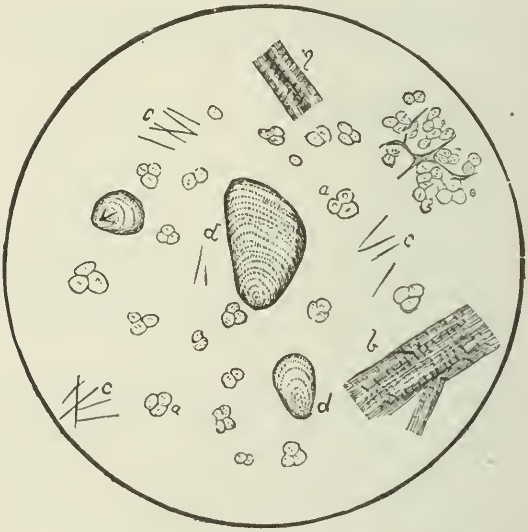
Whether the new Bolivian plantations, which certainly must be a source of some uneasiness to the planters on Java (and British India), will be managed with sufficient energy, will principally depend upon the value of bark during the next three or four years.—New Rem., February, 1881, pp. 43–45.

Cinchona—Species occurring in the U. S. Commerce.—Mr. J. C. Reeve has communicated to "Am. Jour. Pharm." (November, 1880, pp. 529–537) a very interesting paper on the species of cinchona occurring in commerce in the United States, with notes on their microchemical determination, and cuts showing the microscopic characters of the more important barks. The aim of the author's paper has been "to state experience in practical work done on a limited variety of barks in a limited space of time, and to aid, if possible, beginners in this field." The paper does not admit condensation.

Cinchona Barks—Commercial Analysis.—Dr. John Muter, who has had occasion to study every method proposed from time to time for the commercial analysis of cinchona barks, now publishes that which he has found to be the best in practice. It is a modification of that originally proposed by De Vrij and Moens, and will be found in New Rem., March, 1881, pp. 80, 81; from the Analyst, 1880, p. 223.

Ipecacuanha—Adulterated Powder.—Louisa Reed Stowell has examined a number of specimens of powdered ipecacuanha, all of which had more or less potato starch. Two of them also contained cornmeal. The annexed cut illustrates some powdered ipecacuanha adulterated with potato-starch. Almond meal, licorice, cornmeal, and potato-starch have been mentioned by others. The presence of almond-meal may be detected by the development of hydrocyanic acid upon infusion with water. The presence of the seed-coats as well as the central part of the almond may be detected by the microscope. The central part or the cotyledons are composed of thin-walled hexagonal cells, smaller than the cells of the bark of the ipecacuanha, and loaded with oil-drops. They are entirely free from starch-grains. Minute spiral vessels are frequently scattered through these cells. The outer seed-coat, or the dark brown scurfy part of the almond, is made up of large oblong cells, with peculiar pits or dots covering the cell-wall. They are about 1-500 of an inch broad and nearly twice as long. Almond-meal, however, is probably not of very common use for mixing with ipecacuanha. Licorice can be detected by its taste and odor; to detect it microscopically it is necessary to compare the pure powders of ipecacuanha and of licorice with the adulterated article.—Am. Jour. Phar., June, 1881, p. 302, from The Microscope, April, 1881.

Fig. 59.



Powdered ipecac: *a*, starch-grains; *b*, woody fibre; *c*, crystals; adulterated with *d*, potato-starch.

Coffee—Determination of Chicory, Dandelion, etc.—F. M. Rimmington draws attention to the fact that a weak solution of hypochloride of lime, while it has very little action upon roasted coffee, very soon deprives chicory, dandelion, and probably some other substances, used to adulterate coffee, of color. The property is applied to the examination of coffee as follows: The coffee is boiled for a short time with water containing a little carbonate of soda, so as to remove extractive as much as possible; after subsidence the liquor is poured off, and the residue washed with distilled water. When this has been sufficiently done, a weak solution of hypochlorite of lime is to be added and allowed to remain, with occasional stirring, until decoloration has taken place, which will probably be two or three hours. The coffee will then form a dark stratum at the bottom of the glass, and the chicory a light and almost white stratum floating above it, and showing a clear and sharp line of separation. The chicory after this operation is in the very best condition for microscopical examination, and it is not difficult to discriminate between chicory, dandelion, or other substances. Although the lower stratum may be dark, and have all the appearance of coffee, other substances may be present and should be sought for.—Phar. Jour. Trans., January, 1881, p. 529.

Coffee—Products Obtained by Roasting.—Bernheimer obtained as chief products resulting from the roasting of coffee: Palmitic acid, about 48 per cent.; caffeina, 0.18 to 0.28 per cent.; caffeol, 0.04 to 0.05 per cent.; acetic acid, and carbonic acid gas. As minor products he obtained: Hydroquinone, methylamine, pyrrol, and acetone (?).

Caffeol is an oil, boiling at 195° to 197°, which possesses the aroma of coffee in a very high degree. It has the composition $C_8H_{10}O_2$; it unites with concentrated solution of potassa, is oxidized by fusing caustic potash, or bichromate of potash and sulphuric acid, to salicylic acid, and shows a great tendency to resinify. The author therefore concludes that it is a methyl ether of saligenin. The coffeotannic acid appears to remain behind in the beans to a great extent on roasting. It can, however, still be considered as the source of the caffeol, as on heating it gives a coffee-like odor.—Am. Jour. Phar., January, 1881, p. 19, from Wien. Akad. Ber., 81, II. p. 1032.

Coffee Oil—Characters.—C. O. Cech communicates some preliminary work on the subject of coffee oil. During the roasting of coffee berries the odor of the oil is very apparent, and it may be seen on the surface of the concentrated extract of coffee in the form of small drops. The quantity of oil present varies according to the source and condition of the berries, being from 8 to 13 per cent., and of this at least one-half is volatilized during the process of roasting. No considerable escape of gas or oil-vapor occurs during the roasting until the berries turn brown. At that stage, the berries are turned out and tossed in the air so as to cool them very rapidly and prevent their burning; the oil vapor is thus lost, but might be saved by connecting the roasting drum with an exhauster, which would prevent the risk of the berries catching fire, and would render it possible to remove and condense the vapor of the oil. The oil thus obtained would doubtless be valuable for liqueurs.

The preparation of the oil was carried out by extracting it from 50 pounds of powdered coffee berries of various kinds by means of ether-alcohol. In this way about 1200 grams of a green transparent thick oil were obtained. It deposited crystals of caffeia after standing for a time; and after three years separated into crystalline, fatty acids, and a clear, green layer of liquid oil, the crystals forming about two-thirds of the whole.—Phar. Jour. Trans., May 7, 1881, p. 914, from Jour. Chem. Soc., March 1881, and J. Pr. Chem. (2), 22, pp. 395–398.

Georgia Bark (*Pinkneya pubens, Michaux*).—The New York "Times," drawing attention to the importance of making systematic experiments for cultivating different species of cinchona in the United States, states that there exists a "pseudo-cinchona" tree in Georgia. Professor J. M. Maisch, referring to this, observes that the tree alluded to is undoubtedly the one called "Georgia bark," in Porcher's "Resources of the Southern Fields and Forests." This is the *Pinkneya pubens* of Michaux, ord. Rubiaceæ, subord. Cinchoneæ, which is found on river banks and in swampy localities from South Carolina southward to Florida. Under cultivation it usually branches from the base, but in its native localities it is a beautiful tree, twenty feet or more in height, with large opposite ovate and acute leaves, and with downy cymes of purple-colored flowers, which are radiant by the expansion of the calyx segment of the marginal flowers. It has some reputation in the treatment of intermittent fever, and though too slow in its action to be used as a substitute for quinia, is by Dr. Fauntleroi, of Virginia, believed to deserve a position in the front ranks of vegetable tonics. Dr. Farr is said to have detected a considerable amount of cinchonia, and, though this is probably incorrect, the substance obtained may have been an alkaloid.—Am. Jour. Phar., February, 1881, p. 81.

CAPRIFOLIACEÆ.

Sambucus Nigra—Pharmaceutical Treatment, etc.—Mr. E. Goværts has experimented on the methods of preserving the medicinal properties of the elder. Both leaves and bark are considered purgative by old writers. The active principle is found to be entirely destroyed by heat. The best preparations are the expressed juice of the fresh leaves, and a wine of the fresh bark. The unpleasant taste of the juice is best covered by the addition of 5 drops of peppermint (essence?) to 2 ounces, in which quantity it purges without causing nausea or vomiting. The wine is made by macerating 3 parts of the fresh inner bark in 10 parts of Malaga wine. Dose, ½ ounce to 1 ounce. This preparation keeps well, and is not disagreeable.—Chem. and Drug., December, 1880, p. 532, from Jour. de Pharm. d'Anvers, November, 1880, p. 430.

Cornus Circinata—Proximate Examination.—Mr. Robert Gibson, Jr., has experimented with the bark of *Cornus circinata*, and determined, besides much tannin and some sugar, the peculiar bitter principle *cornin*. The process adopted was that employed by Mr. Frey in 1879, for obtaining the same principle from *C. florida*.—Am. Jour. Phar., September, 1880, p. 433.

Viburnum Prunifolium—Proximate Constituents.—Mr. Herman Van Allen has subjected the bark of the root to proximate examination, and sums up his results as follows: 1, a brown resinous body, of a very bitter taste, from which it was impossible to separate sugar; 2, a greenish yellow resin or neutral body, of a bitter taste, slightly soluble in water, freely so in alcohol, called by Krämer viburnin; 3, a volatile acid answering to all the tests of valerianic acid; 4. a tannic acid, giving greenish-black color with ferric salts; 5, oxalic acid; 6, citric acid; 7, malic acid; 8, sulphates and, 9, chlorides of calcium, potassium, and iron.—Am. Jour. Phar., September, 1880, p. 439.

UMBELLIFERÆ.

Æthusa Cynapium (Fool's Parsley)—*Innoxious Character.*—Dr. John Harley, after drawing attention to the prevailing assumption of the noxious properties of "fool's parsley," which has been carried down to us for several centuries, communicates the results of physiological experiments made with the expressed juice of the plant collected before flowering and from the plant in green fruit, which prove very conclusively its innoxious character. Given in doses of ¼ to 2 ounces to a little girl six years old; taken by himself in doses of from 2 to 4 ounces, and given to other adults in doses of from 1 to 8 ounces, neither of the juices produced the slightest effect. The statement made by many authors, that "the leaves of fool's parsley when bruised emit a peculiar disagreeable odor, which is altogether different from that of parsley," is also based on error. It is faint, and resembles that of parsley itself. From 1 pound 15½ ounces of the young plant, Mr. Walter Hemingway obtained 1 pound 7½ grains of juice; whilst 12 pounds 10 ounces of the older plant (in green seed) yielded only 5 pounds 1 ounce of juice. Both were preserved by the addition of one-third their bulk of spirit, and were not filtered. 500 grains of the first yielded 20.3 grains of varnish-like, orange-brown extract, and the same quantity of the second yielded 53 grains, which, however, was rather dark and charred. The author believes fool's parsley to be so innoxious that it might well be used as a potherb or salad.—Phar. Jour. Trans., November 27th, 1880, p. 437.

ARALIACEÆ.

Aralia Spinosa—Proximate Analysis.—Mr. Louis H. Holden has obtained from the so-called false prickly-ash bark (*Aralia spinosa*), besides tannin, resin, and chlorophyll, a bitter substance which he proposes to name

Araliin.—It was obtained in form of lightish-yellow scales, which are soluble in alcohol and dilute acetic acid; very soluble in water, producing a persistently frothing solution upon agitation; insoluble in benzin, chloroform, and ether. By boiling with dilute hydrochloric acid it is decomposed; a white, tasteless, and odorless substance is deposited, which the author has named

Araliretin, and glucose is found in the supernatant liquid.—Am. Jour. Pharm., August, 1880, p. 390.

Mr. Charles William Elkins has also subjected the bark of *Aralia spinosa* to proximate examination, and has obtained results which differ from those of Mr. Holden. He finds the organic constituents of the bark to be starch, glucose, gum, pectin, two acrid resins, volatile oil, and an *alkaloid*, the latter being the bitter principle. All attempts to obtain the latter in crystals failed. He finds that this principle gives a decided precipitate, from acidulated aqueous solution, on the addition of Mayer's reagent, and on this reaction bases his belief in its alkaloidal character. No other evidence is offered.—Ibid., pp. 402–404.

Panax Ginseng (C. A. Meyer)—*Cultivation in Japan.*—Dr. J. J. Rein (in "Peterm. Mittheil." Ergänzungsheft, No. 59) gives the following interesting description of ginseng cultivation as practiced in Japan, where the plant has so far been met with only in the cultivated state.

The Japanese choose, for the cultivation of ginseng, a dark rich soil in a dry situation, since the roots are known to grow of a proper size and of a white color only under those circumstances. In soil containing iron they assume a reddish tint and are then much less valued. The well-prepared and carefully manured field is divided into beds, which are usually 27 Japanese feet (8.18 meters) long, 2½ feet wide, and 2 feet distant. They trend from east to west. In order to protect the plants from direct sunlight and violent rainfalls, each is surmounted, at a height of ½ to ⅗ meters, by a permanent roof of straw resting on poles, which has an inclination to the south. This arrangement generally permits plantations of ginseng to be distinguished even at considerable distances. In Southern Japan, for instance in the province of Hoki, Idzumo, etc., the seeds are planted in November;

in the northern districts, in April. They are placed in the well-hoed and deeply dug beds, at intervals of two or three inches, and at about the same depth, in two parallel rows, distant from each other about one foot. The plant grows slowly and requires about three years and a half for its full development. Hence the various stages may be observed on different fields, some of them having plants of the first year (*ichi-nen shô*), plants of two years (*ni-nen shô*), of three years (*san-nen shô*), and of four years (*shi-nen shô*). The plants of the first year have, up to the autumn, only one or two leaves, but no stem. Such a leaf is three-foliolate, like that of clover, and, including the petiole, has a length of 8 to 10 cm. The oval-pointed leaflets have strongly dentate margins. The cylindrical perennial root is comparatively much more strongly developed. During the second summer the plant grows a plain smooth stem, which is divided above into two or three petioles. The single leaves are now digitate, five-foliate and developed symmetrically, the middle one being the largest. Shape and margin of the leaflets are the same as in the preceding year. The root has about the same length (about 12 cm.) as the stem above ground. During the third summer, and at half its height, it emits a corona of 3 to 5 leaves, each consisting of 5 leaflets, which are a little large, but otherwise the same as in the preceding year. The smooth petioles, as well as the lower part of the stem, have a reddish-brown color. The axis of the plant is continued upwards, as a naked greenish shoot, from the base of the leaves to a distance of 10 to 20 cm., and ends in a single umbel at the extreme end, which is sometimes accompanied by a second, smaller one, placed somewhat lower or laterally. The flowering shoot is cut off in the third or fourth summer, except if it is desired to obtain seed. In the latter case, the fruit, when ripe, is a brilliant scarlet-red berry, about the size of a pea, laterally compressed, and containing two grayish seeds of about the size of hemp-seed. After the seed is collected, it is buried about one or two feet deep into the ground until the following November or spring, because it has been found that its vitality can be preserved only in this manner.

The ginseng roots are gathered during the *doyo* (= July and August) of the fourth summer. They are cylindrical, not over a finger thick, and are frequently bifurcated below, of a white color, and of an odor and taste recalling that of carrots. The average weight of a fresh ginseng root is 20 to 25 grams; seldom twice as much. After the roots are dug up, they are freed from fibres and other extraneous matters, and carefully washed, then quickly scalded in boiling water or steam, so that a section afterwards has a brownish-yellow and horny appearance. They are then put into a drying apparatus, arranged in 12 trays placed one over the other, the bottoms of which consist of strong paper, and are exposed, for two to eight days, according to their size, to a heat of 100° to 120° C., whereby they are rendered completely dry and marketable. Sometimes they are dried in the sun, which method, however, consumes a much longer time. Dried ginseng-root is yellowish to brown, semi-transparent, somewhat brittle, and has a bitterish-sweet slimy taste. It must be carefully guarded against dampness and small insects (rhynchophori). It is usually employed in form of decoction or extract. The stems and leaves of the plant are boiled to a black tough mush, which has a sweetish taste, mixed with slight bitterness. This mush is not exported.

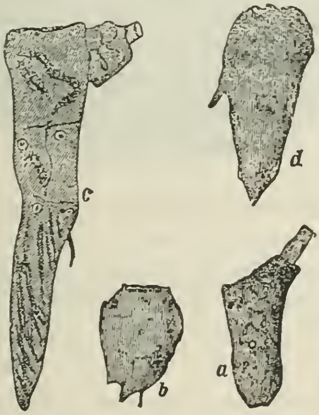
The prepared ginseng-root is rapidly bought up by dealers, who pay to the Japanese grower 5 or 7 yen (dollars) per kin, or pound of 600 grams. In China the same amount is worth 10 yen (dollars). Manchurian ginseng is still higher in value, particularly a very choice kind, which somewhat resembles amber, and which is often paid for with six or eight times its weight in silver. Since the younger generation of Japanese physicians have begun to employ European methods of treatment, the value and reputation of ginseng in Japan have considerably decreased, so that each year larger quantities become available for export to China. In former years this business was in the hands of the Dutch at Nagasaki; but at present it is mostly carried on directly by Japanese or Chinese shippers and merchants, by way of Osaka. The value of the export amounts annually to about 180,000 dollars.—New. Rem., August, 1880, p. 226.

RANUNCULACEÆ.

Japanese Aconite Root—Description and Source.—D. v. Wasowicz has given a description of the Japanese aconite examined by Paul and Kingzett. The roots resemble Hanbury's drawings of a Japanese aconite root, named by him "tsaou," so completely that Mr. Wasowicz has made fresh drawings only for the sake of completeness. They are chiefly elongated radish-shaped and less frequently ovoid tubers (Fig. 60), almost always flattened at the top and presenting distinct remains of lateral stalks. At the lower extremities they are generally conical, but some of them are round, and a few of them are pointed. They are irregularly and scantily furnished with a few lateral roots, or only with the scars of these. Externally they are grayish-brown, almost blackish, with numerous longitudinal wrinkles and comparatively many transverse wrinkles, so that the surface of some pieces appear divided into irregular quadrangular spaces. They measure from 1.5 to 5.2 centimeters in length, and have a maximum diameter of 9 millimeters to 1.4 centimeter, and they weigh from 0.5 to 3.53 grams. The weight of most of the tubers varies from 1.2 to 2.8

grams. The fracture is granular. The roots are internally white and quite free from smell. The taste is at first farinaceous, with a sweetish bitterness, and soon after burning, acrid and irritating. A transverse section is quite white, and under the microscope it appears as a uniform tissue, intersected by eight to sixteen bundles of vessels, which inclose a proportionately large pith. Concentrated sulphuric acid colors the section pale-reddish, but only after long-continued action. Solution of iodine in iodide of potassium produces at first a deep-blue color that soon becomes black. Perchloride of iron produces no effect at first; subsequently it gives rise to a grayish coloration. Millon's reagent produces a very slight grayish coloration, that soon passes into distinct yellow, and an alkaline cupric tartrate indicates only an extremely small quantity of protein substance. Under the microscope the outer rind of the root appears to be formed of five to seven rows of crowded roundish and tubular cells of a light-brownish color. After this follows a layer consisting of from four to ten rows of extended and equal-sized collenchymatic cells only slightly thickened, and with proportionately very many stone-cells imbedded in them. The next layer is prominent and consists of rounded slightly thickened parenchymatous polyhedric cells, which are not yellow colored as in *Aconitum heterophyllum.* Next to this follows the principal tissue, composed of several rows of extended cells, which are more rounded and gradually more contracted towards the centre, and about the vascular bundles have the smallest diameter. These are also parenchymatous cells. In this tissue there are circularly distributed vascular bundles to the number of eight or sixteen, which consist of from five to eight vessels grouped together in rows. These

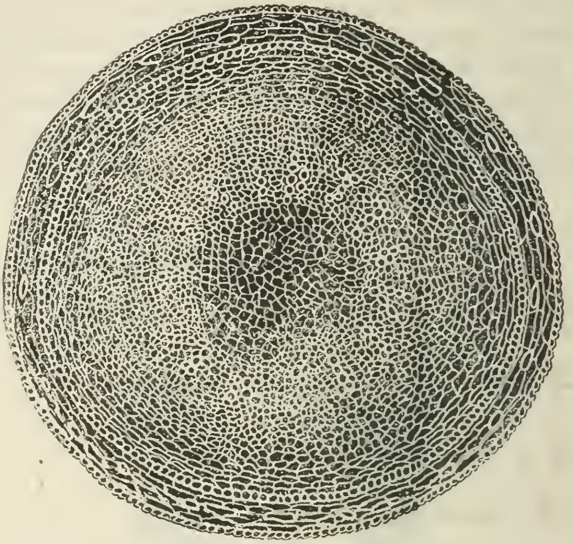
FIG. 60.



Tub. Aconiti Japonici.—Tsaou-woo, natural size.

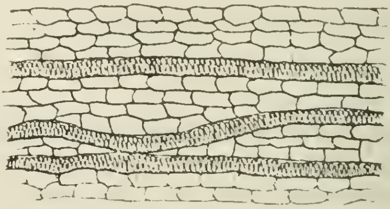
latter are almost always spiral, very seldom scalariform-thickened, and their walls are yellow-colored. The pith inclosed by these bundles also consists of rounded polyhedric cells, with scarcely any intercellular spaces between them, and exceeding three or four times in size the cells of the principal tissue. The form of this central tissue is generally regularly rounded, but here and there, though seldom, and only in the upper part, is elliptic. The normal aspect of such a transverse section is represented by Fig. 61. The longitudinal section (Fig. 62) distinctly shows that the several vessels of the stalk cicatrix

FIG. 61.



Transverse section through middle of root, strongly magnified.

FIG. 62.



Longitudinal section, strongly magnified.

extend separately to the end of the root, and do not anastomose, though they are often bent and curved. The lateral roots, to judge from the remains of them, scarcely differ from the principal roots, except that in them the stone-cells are very scantily distributed. The contents of all the parenchymatous cells consist of single minute and perfectly round starch-granules, which are frequently grouped together in small lumps, less frequently separate, and still less frequently in compound granules, which are never composed of two members. The root dried at 100° C. yielded 2.799 per cent. of ash, which was found to consist of Fe,Al,Mg,Ca,Ka and traces of Na, combined with $H_2SO_4.H_3PO_4$, H_2SiO_3, and HCl. An extract prepared from these roots was much more acrid than a corresponding extract made from the roots of *A. napellus*, and corresponding to one made from the roots of *A. ferox*, to which the author refers Japanese aconite.—Phar. Jour. Trans., August 21st, 1880, p. 149, from Arch. d. Phar., xiv, p. 217.

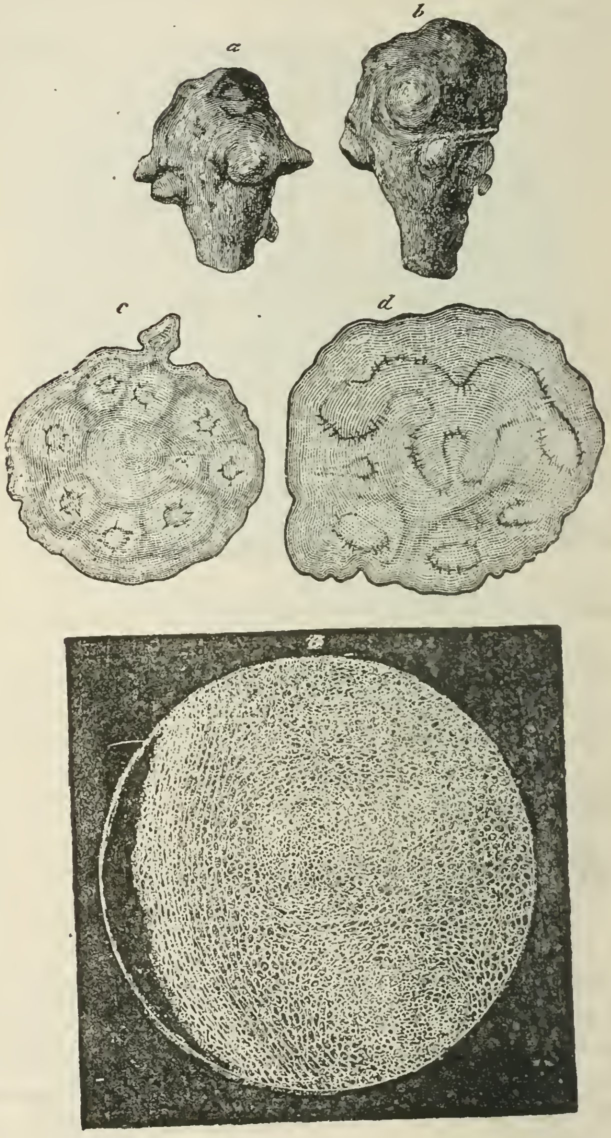
FIG. 63.

附子	1. Bushi (Jap). Fú-tze (Chin.); also called
黒附子	Koku-bushi (Jap), Heh-fu-tze (Chin.).
烏頭	2. Uzu (Jap.), Wú t'u (Chin.); or,
川烏頭	Sen-uzu (Jap.), Ch'uen-wú-t'u (Chin.).
天雄	3. Tenyu (Jap.), Tien-hiung (Chin.).
側子	4. So bushi (Jap.), Tseh-tsze (Chin.).
漏籃子	5. Roranshi (Jap.).
烏喙	6. Utaku (Jap.).
草烏頭	7. Kúsa-uzu (Jap.), Ts'au-wú-t'u (Chin.).

Japanese and Chinese Aconite Roots—Description of those Occurring in Japanese Shops.—Dr. Alexander Langgard gives the following list of the aconite roots mentioned in the "Honzo-Komoku" (the

Pun-tsaou-kang-mŭh of the Chinese); the names are in Chinese letters, with the Japanese and Chinese pronunciation (see Fig. 63), and

FIG. 64.



a. b. "Daibushi," ½ natural size; *c, d*, transverse sections, soaked in water, 1½ times magnified; *c*, microscopic transverse section, with starch removed by treatment with KHO.

refer rather to the form and appearance than to different species. The very careful and detailed description of the aconite roots found with

Japanese druggists, in view of the interest the different kinds of aconite have in recent years attracted, has been abstracted for this report. Of the five sorts found in the shops one is imported from China; the other four are Japanese, and are used in Japan in place of Chinese. The Chinese variety is called:

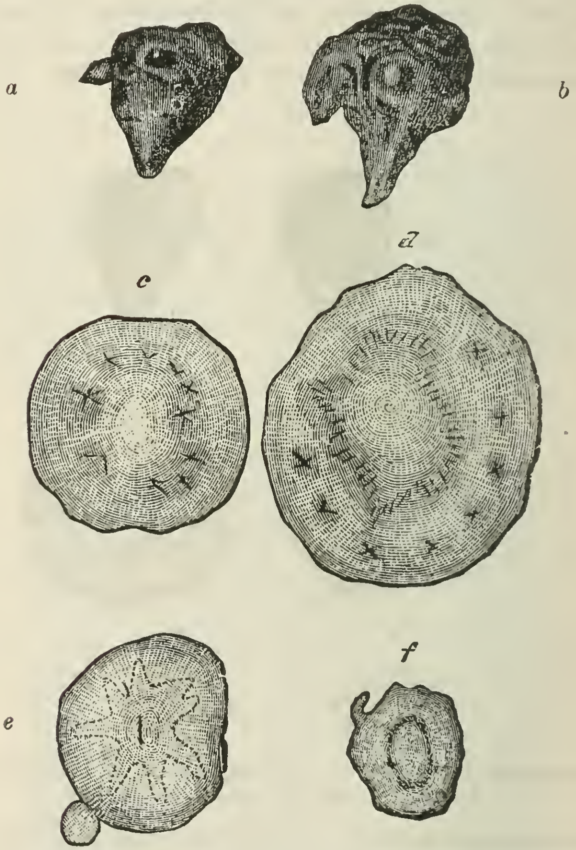
1. "*Daibushi*" (Fig. 64, *a* to *e*), meaning "larger Bushi." It is imported in the salted condition, appearing as large heavy napiform tubers (*a* and *b*, ½ natural size), of a dirty gray or gray-brown color, strongly wrinkled, mostly having dried-up buds and bearing scars of adventitious tubers that have been cut off, and small warty excrescences. They are from 35 to 55 mm. (average 45) long, 30 mm. in the greatest diameter, and weigh from 6.7 to 16.6 (average 9.7) grams. In the air they become moist. They are tough to cut, and have a saline taste, with a burning after-taste. The transverse section, of a dirty brown-yellow color, exhibits a very irregular figure, as in *d* (1½ times magnified), which by the Japanese is compared to brain convolutions. Generally the transverse section is characterized by groups of vascular bundles arranged in a circle, which are separated from one another by a somewhat denser dark-colored tissue (*c*). Each of these groups represents, as it were, a system complete in itself. Under the microscope can be seen in each a circular cambium, four or five vascular bundles, and a pith. The fundamental tissue consists of thin-walled polyhedral cells, which are completely stuffed with starch-granules. (These starch-granules are removed in the microscopic section (*e*) by treatment with potassium hydrate.) In the immediate neighborhood of the system the cells are somewhat thick-walled, and arranged to correspond with the circular figure. The outer layer of the bark consists of a few rows of dark-brown, thick-walled, compressed tabular cells. Next to these, inwards, follows a layer consisting of from five to seven rows of tangetically elongated cells, which is marked off from the remaining tissue by a cellular sheath. The cells of the cellular sheath are square and yellow in color. Stone-cells do not occur.

These are probably the tubers to which F. Porter Smith refers under "Fú-tsze," but of which he then further remarks that they are said to come from the same plant as yields the "Ch'uen-wú-t'u," which latter tubers he derives from *Aconitum chinense*. The author considers the "Daibushi" to be certainly secondary tubers,—firstly from *A. chinense*,—but secondary tubers which are again on the point of growth, after the tuber from which they sprang has already died off.

2. "*Sen-uzu*" (Fig. 65, *a* to *f*).—These are tubers grown in Japan, and are said to come into commerce from the northern part of Nippon. In appearance they correspond perfectly with the tubers figured by Hanbury in his "Notes on Chinese Materia Medica" ("Science Papers," p. 258), under the name of "Chuen-woo," and referred by v.

Schroff to *Aconitum chinense*, Sieb. The tubers are smaller than the previous ones, more roundish or conical (see *a* and *b*, ½ natural size), of a gray color, dusty, smooth or only finely wrinkled, seldom worm-eaten, pressed in at the top, frequently bearing the remains of a bud, and with small warty excrescences on the sides. The point as well as the secondary tubers are removed. They are from 15 to 40 mm. long, attain a thickness of 30 mm. in the greatest diameter, and weigh from 2.5 to 7.4 grams (average 4.5). They are very hard and difficult to cut, pure white and mealy at the transverse section, after soaking in water becoming gray-white or yellow-brown. By means of the transverse section three different kinds may be distinguished.

FIG. 65.



a, b, "Sen-uzu," ½ natural size. *c, d,* Transverse section soaked in water, 1½ times magnified. *e, f,* Transverse sections of the upper and lower part of a tuber.

(1.) With a closed, clearly-defined cambium ring, drawn on in the upper part of the tuber into a five to seven-angular, more or less star-shape; in the lower part elliptical or annular; inclosing a large pith, equalling or exceeding the bark in breadth (*e* upper and *f* lower part of same tuber). Examined microscopically the outer layer of bark appears to consist of a few rows of brown, pressed together, tabular cells. The middle layer, consisting of seven to twelve rows of tangetically elongated cells, and inclosing dispersed stone-cells, is separated from the inner layer by a cellular sheath of square yellow cells. The cells of the inner layer are tangetically elongated at the circumference, but become polyhedral towards the centre. The medulla consists of large roundish polyhedral cells, which, as well as the inner layer cells, are filled with starch-granules. The vessels stand either in rows, or they form a bow opening outwards.

Fig. 66.

a, *b*, "Katsuyama-bushi," ½ natural size; *c*, *d*, transverse sections, soaked in water, 1½ times magnified; *e*, *f*, transverse sections, ½ natural size.

(2.) In this kind the cambium ring is angular, not star-shaped. But there are besides, in the broad inner bark layer, arranged in a circle, eight to ten or more groups of fibro-vascular bundles, which appear under the microscope as small stars (*d*). The microscopic structure resembles otherwise that described under (1).

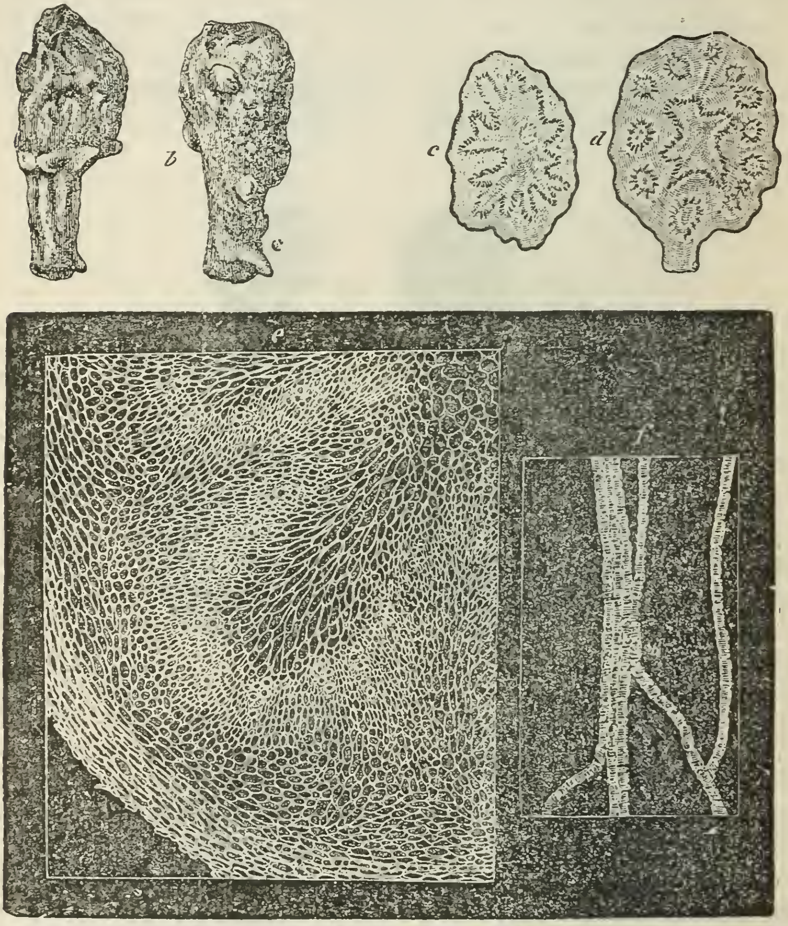
(3.) In this kind (*c*) a closed cambium ring is wanting. In a fundamental tissue consisting of parenchymatous cells are vascular bundles arranged in a circle, which microscopically appear as small stars.

The author considers the above to be tubers of a species originally

Chinese, which has been introduced into Japan as an ornamental plant, and in some districts (Oshu) is cultivated on account of its tubers. He has never met in Japan with wild species of *Aconitum* having similar tubers.

3. "*Katsuyama-bushi*" (Fig. 66, *a* to *f*). These are tubers which come into commerce from Katsuyama, and are named after that

Fig. 67.



a, *b*, "Shirakawa-uzu," ½ natural size; *c*, *d*, transverse sections, soaked in water, 1½ times magnified; *e*, microscopic transverse section, with starch-granules removed by K H O; *f*, vessels.

place. The tubers, shown at *a* and *b*, ½ their natural size, are conical or napiform, dirty gray or yellow-brown, soft, tough, covered with an earthy saline crust, bear scars of secondary tubers that have been cut off, are strongly wrinkled, shrivelled, and have a cortex that easily exfoliates. The largest, covered with numerous warty excrescences, resemble in their exterior the smaller "Daibushi." They are 18 to 38 mm. long, and weigh 4.1 to 14.7 (average 8.8) grams. They are almost always worm-eaten. The transverse section, of a light clay color, is tough and horny, and shows after steeping in water a dark, closed, almost circular cambium ring, drawn out towards the cortex in sinuses and undulations, but not star-shaped, and inclosing a medulla more than double the width of the cortex (*c* and *d*). In other tubers the cambium ring is star-shaped (*f*). Finally, some are met with also in which the cambium ring is wanting; the vascular bundles lie scattered and separated from one another by a denser tissue (*e*). The cortex is fissured. Examined microscopically it presents no special characters. The origin of these tubers is not known to the author.

4. "*Shirakawa-uzu*" (Fig. 67. *a* to *f*).—This is called after a locality "Shirakawa." The tubers (*a* and *b*) present an appearance essentially different from all those previously described. They are long, napiform, gradually-tapering tubers, without remains of stem, frequently pressed somewhat flat, here and there curved, with the points cut off and consequently ending broadly truncate, wrinkled longitudinally, with a warty surface, and bearing the scars of adventitious tubers that have been cut off, of a dirty gray color, coated with an earthy saline crust, soft, tough to cut, strongly hygroscopic, and having a saline taste that afterwards becomes acrid and burning. The transverse section (*c*) is nearly oval, gray-white, fatty and fibrous. The cambium is drawn out into numerous radiations or points, the separate points being obtusely rounded. The medulla is large, and in the centre of a dark gray color. Examined microscopically, the outer layer of bark appears to consist of two or three rows of pressed-together, thick-walled, brown-colored cells. The middle layer, consisting of five to seven rows of tangentically elongated cells, shows scattered stone-cells, and is separated from the inner layer by a cellular sheath formed of square yellow cells. The inner bark, in its outer layer, consists of tangentically elongated cells; towards the centre these become more roundish polyhedral, but in the interspaces between two neighboring points are elongated radiantly. The fibrovascular bundles, consisting of four to eight vessels arranged in rows, are separated from one another by medullary rays, which are thus allowed to penetrate to the bark. The vessels (*f*) themselves are scalariform, provided with transverse walls, and frequently curved like a knee. The medulla consists in the centre of large polyhedral cells; where it fills up the points, the cells are much elongated radiantly. The cells of the bark and of the medulla are filled with starch (see *e*, showing the microscopic transverse section with starch-granules removed by potassium hydrate).

Besides tubers with the transverse section described, some are met with in which the cambium ring does not radiate so far; the medulla is smaller, scarcely attaining to the thickness of the inner bark layer, in which stand three to twelve vascular bundles arranged in a circle, and separated from one another by a denser tissue (d). Examined microscopically these tubers show a structure similar to that described under "Daibushi." Upon the origin of these tubers, the author can give no information. They are, however, likewise prepared and salted.

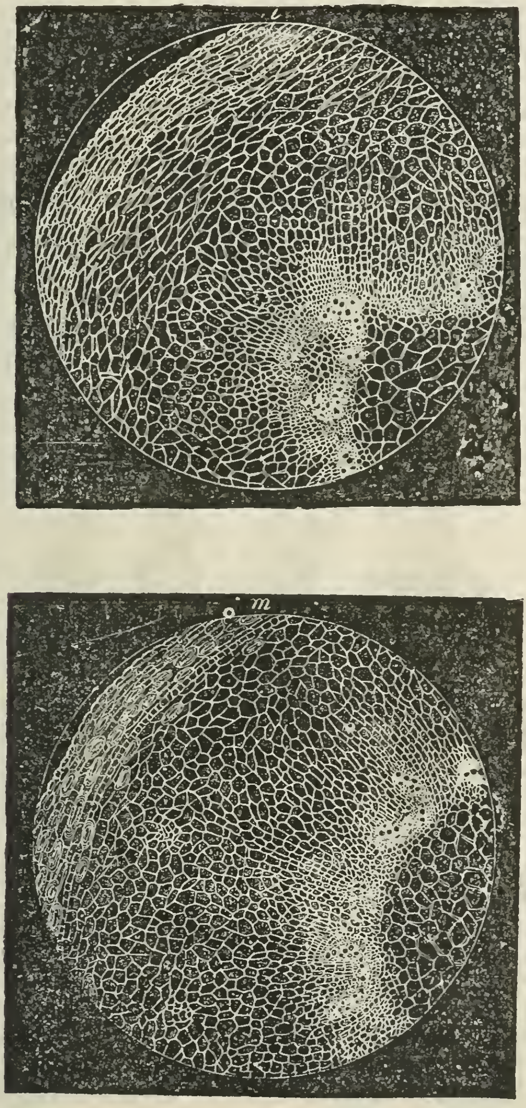
5. "*Kusa-uzu*" (Figs. 68 and 69),—These are small, napiform tubers (a to f, a showing a specially large specimen), gradually tapering, mostly running to a point, seldom ending obtusely, frequently pressed somewhat flat in the upper part, and slightly crooked. They are of a gray-brown color, generally strongly wrinkled longitudinally and transversely, seldom smooth, frequently bearing the remains of the stalk and the scars of adventitious tubers that have been cut off, worm-eaten, 1.5 to 3.5 cm. long, 0.8 to 1.5 cm. broad in the greatest diameter, and weighing 0.7 to 1.5 gram. In transverse section (g to k) it is yellowish or pure white, mealy in a few examples, horny, and these

Fig. 68.

a to f, "Kusa-uzu;" g to k, transverse sections, soaked in water 1½ times magnified.

of a dirty gray color. The bark, $\frac{1}{4}$ to $\frac{1}{3}$ of the diameter, is separated from the medulla by a darker, seldom brown, generally in some places somewhat stellate, cambium ring. Occasionally separate vascular bundles are met with scattered in the inner bark. The microscopic structure is shown by *l* and *m*, *l* giving the structure of the tuber with the drawn-out cambium ring; *m*, that of the tuber with the round

Fig. 69.



l, *m*, Kusa-uzu, microscopic sections, treated with KHO, of *h* and *k* (Fig. 68).

medulla. The latter is distinguished by the large number of stone-cells and the distinct medullary rays.

The toxic power of the last-named variety and of "Sen-uzu" is most powerful; then follow "Shirakawa-uzu" and "Daibushi," almost equally powerful, and lastly "Katsuyama-bushi." They yield respectively the following percentages of alcoholic extract:

"Sen-uzu" yields	4.92	per cent.	extract.
"Kusa-uzu" yields	8.14	"	"
"Katsuyama-bushi" yields	11.57	"	"
"Daibushi" yields	15.00	"	"
"Shirakawa-uzu" yields	22.32	"	"

The most poisonous extract is yielded by "Sen-uzu," and "Kusa-uzu;" then follows "Daibushi;" the "Shirakawa-uzu" has a somewhat weaker action, and last comes "Katsuyama-bushi" extract. In how far the peculiar process of "preparation" and "salting" may have affected the strength of the respective drugs, it is difficult to say. In the instance of some it appears to have had the effect of depriving them of activity. The author draws attention to the botanical relations of the tubers described, but is unable to come to a final decision.—Phar. Jour. Trans., June 11, 1841 and 1881, pp. 1021,–1025, 1045, from Arch. d. Pharm., xv., p. 161.

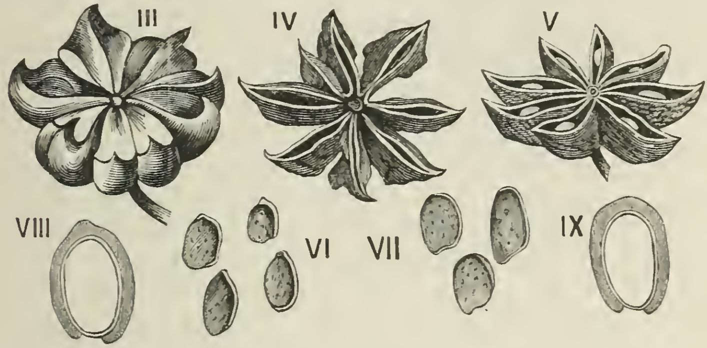
MAGNOLIACEÆ.

Star Anise—Poisonous Variety.—A. J. C. Geerts, of Yokohama, has published in the "Pharm. Weekblad" a notice of a fruit closely related to star anise, which has heretofore been but little noticed by pharmacologists—though it had occasionally been pointed out as poisonous and suspicious—and the mother-plant of which has even been repeatedly described as the true *Illicium anisatum*, L. The fruit in question is derived from *Illicium religiosum*, Sieb., a Japanese tree, the evergreen branches of which have been used from time immemorial for decorating the temples and statues of the gods in Japan, but the fruits of which are regarded as poisonous, and are actually so, as is proved by a recent case of poisoning in the district of Kanagawa, where the oil pressed from these seeds had been used in cooking and had caused the death of an adult, and the serious illness, characterized by repeated vomiting, of five other persons. This oil is used in Japan for illuminating or lubricating purposes only, and never in cooking; the fruit is likewise never used as a condiment, while on the contrary, the real star anise, that is, the fruit of *Illicium anisatum*, L., which is not a native of Japan, is commonly imported and used.

The confusion or false identification existing, even in modern text-books, between these two species of *Illicium*, is owing to a mistake of Linné, who regarded the Japanese tree, as figured by Kæmpffer, in his "Amœnitates Exoticæ" (Lemgo, 1712), as the mother-plant of genuine star anise, and described it as *Illicium anisatum*, L. But instead of this being synonymous with *I. religiosum*, it is entirely different from the true *I. anisatum*, native of Cochin-China, and described under the latter name by the Portuguese missionary and botanist Loureiro, although even the latter regarded both species as identical. —From Pharm. Zeit., 1880, No. 70, in New. Rem., February, 1881, p. 54.

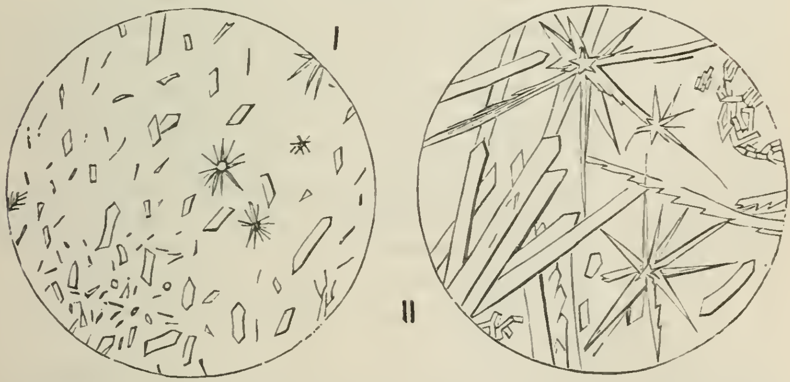
Illicium Religiosum, Sieb.—*Poisonous Constituent, etc.*—Mr. J. F. Eykman has undertaken experiments to separate from the fruits of this plant (Jap. *Shikimi no ki*) a definite poison in a pure state. He has succeeded in separating a colorless crystalline substance, which is evidently a powerful poison, since 12.5 milligrams were sufficient to cause the death of a young dog in three hours. He proposes to name the new substance provisionally "*Sikimin*," until its identity with a

FIG. 70.



Illicium Religiosum.—III. Unripe fruit. IV. Ripe fruit. VI. Seeds. VIII. Section through testa.
Illicium Anisatum.—V. Fruit. VII. Seeds. IX. Section through testa.

FIG. 71.



Sikimin crystals.

known substance is established. Under the microscope it shows stellate-grouped pointed crystals. Prismatic forms were observed in one case. The crystals are hard, heavy, dissolve with difficulty in cold water, better in hot water, ether, and chloroform, easily in alcohol and glacial acetic acid, do not dissolve in petroleum spirit, nor in alkalies markedly better than in water. The new substance, which is not regarded as entirely pure, does not appear to be a glucoside, and contains no nitrogen.

The author, furthermore, determined the presence of alkaloid both in the Japanese star anise and in the true star anise, which was, however, not further investigated. A comparative examination of the volatile oils of these two varieties of star anise, of common anise, and of fennel, was also made. Physiological experiments made with rabbits show poisonous action, which corresponds to that of essential oils generally, and particularly those containing anethol; but the essential oil of the Japanese fruit seems to act deleteriously in somewhat smaller doses than ordinary oil of anise, and is probably due to the larger proportion of terpene contained in the former. The following table shows the result of the examination of the several oils:

	Ol. Anisi vulgaris.	Ol. Fœniculi.	Ol. Anisi stellati.	Ol. Illicii religiosi.
Constituents.	Chiefly solid and liquid anethol.	Small quantity of terpene boiling at 190° C., and liquid and solid anethol.	Chiefly solid and liquid anethol.	Rather much terpene boiling at 173° to 176° C.; liquid anethol boiling at 232° to 233° C.
Melting Point.	+ 6° to 18° C.	— 2° to + 18° C.	About 0° C.	Not solid when cooled to —20° C.
Specific Gravity.	About 0.903.	0.94 to 0.998.	0.978.	1.006.
Molecular Rotation.	0° to + 0.5°.	+ 13° to + 19.5°.	0° to — 0.4.	— 8.6°.
Alcoholic Hydrochloric Acid.	Colorless, afterwards reddish, then pale red.	Colorless.	Colorless.	Colorless, afterwards blue.
Chloral Reagent.	Colorless, afterwards yellow and brownish.	Colorless, then beautiful red.	Colorless, then beautiful red.	Colorless, afterwards dirty brown yellow.
Ammoniacal Silver Solution.	In 24 hours no reduction.	Like ol. anisi vulgaris.	Like ol. anisi vulgaris.	Reduction in a few hours.
Hager's Reaction (oil, six drops; H_2SO_4, 30 drops; when cold, strong alcohol, 10 cc).	In alcohol, a portion of the sulphuric acid and oil mixture remains undissolved, as a thick mass adhering to the sides of the tube.	Mixture of oil, sulphuric acid, and alcohol is perfectly clear.	Like ol. anisi vulgaris.	Mixture is nearly clear; separation of a little reddish white deposit.
10 drops oil, with 60 drops ether and about 0.15 gram sodium.	Colorless; after 4 hours the mixture nearly colorless; deposit yellowish-white.		Colorless; after 4 hours liquid and deposit yellow.	Colorless; quickly bluish; after 4 hours, liquid pale yellow; deposit yellow.

The powdered seed kernels were found to produce death in a young dog in quantities of 3 grams; the fixed oil, obtained from them to the amount of 52.02 per cent. by extraction with petroleum spirit (corresponding to 30.5 per cent. of the entire fruit), given in doses of 2 grams to a small dog. produced no other symptom of poisoning beyond slight symptoms of disgust. The fixed oil was a clear, thick liquid, without special smell, of pale yellow color, which upon warming the oil almost entirely disappeared. It had a specific gravity of 0.919 at 16.5° C., dissolved in all proportions in petroleum spirit, chloroform, ether, benzol, and bisulphide of carbon, and was very slightly soluble in cold absolute alcohol and glacial acetic acid, though dissolving in 15 parts of the former and 2.5 of the latter at their boiling temperature. It contained no free fat acid. The toxic property of the oil, examined by Geerts, must be referred to the probable admixture of a small quantity of the active poison contained in the seed powder, which in the warm pressing passed into the oil.

The author gives a botanical description of the two plants, *Illicium religiosum*, Sieb., and *Illicium anisatum*, Lour., which need not be reproduced here. Much diversity and imperfection in statements exist, and we cannot, therefore, go further at present than to consider the Japanese "shikimi no ki" as a poisonous—probably only as a more poisonous—variety of *Illicium anisatum*, Loureiro.

The pharmacognostic differences of the two fruits, as found by Geerts in a comparison of a sample of fruit of *I. religiosum* with true star anise, are not reliable, since the distinguishing characters are not constant. In the samples compared with one another by him (see Fig. 69), he found that in the seed of the Japanese fruit (vi the seed, viii, a section through the testa), the apex was not rounded, but at the end of the keel terminated in a raised point, which he has never observed in the true star anise (vii, the seed, and ix, a section through the testa). In exceptional cases this peculiarity of the Japanese fruit is less clearly perceptible, and in a large sample these exceptions became somewhat more frequent. But these differences, in connection with the difference in odor and taste, appear to be sufficient for the pharmacognostic distinction of the two drugs, which is given by the author as follows:

True Star Anise.	*Shikimi Fruit.*
Taste sweet, anise-like; odor faintly of anise.	Disagreeable taste, not sweet or like anise. Smell not like anise, but faintly resembling laurel, cloves, and nutmeg.
Somewhat larger than "shikimi" fruits. Surface more resembling cork. Beak short, horizontal, or slightly bent upward, pointing outward. Carpels less	Somewhat smaller than true anise. Surface more shining, red-brown. Beak thin, frequently bent strongly upward or crooked backwards. Carpels more

True Star Anise.	*Shikimi Fruit.*
woody, shrivelled in one upon another, and wrinkled Seed mostly dark brown with rounded apex.	woody, much shrunk in one upon another, wrinkled. Seed mostly yellow-brown, with a stout keel and a raised apex.

—Phar. Jour. Trans., June 18th and 25th, 1881, pp. 1046–1050, and 1066–1068, from Mittheilungen der Deutsch. Gesel. f. Natur.- u. Völkerkunde Ostasiens, vol. xxiii (Yokohama, 1881).

Star Anise—Varieties.—In connection with the above the following description of the several species of Illicium by Mr. E. M. Holmes will be found of interest:

Illicium Anisatum, Loureiro—*Chinese Star Anise or Badiane.*—The plant, described by Loureiro in his "Flora Cochin-Chinensis," vol. i, p. 432, is a native of the high mountains of Yunnan, in Southwestern China and to the west of Canton. According to his account it differs from the Japanese star anise in being only about 8 feet high, in its smaller leaves rounded at both extremities, and by the stamens being about thirty in number. The carpels are eight in number, and although each is furnished with a beak when growing, in the commercial articles they are almost invariably broken off. The character mentioned by Geerts as distinguishing the Chinese drug, viz., that the apex of the carpel is pressed in or extended horizontally is not a distinctive feature. In the young state of the fruit all the carpels are erect, but spread outward as they arrive at maturity; hence the position of the beak will differ according to the degree of ripeness of the fruit when gathered; in many specimens of the Chinese drug it will be found pointing upward. The notch or depression close to the beak just at the end of the upper or ventral edge of the carpel is more shallow (see Fig. 72) in the Chinese drug, and the fruit is generally larger and has more of the carpels developed to their full size than the Japanese fruit.

Fig. 72.

Illicium anisatum, *Lour.*

Illicium Religiosum (Sieb. et Zucc., "Fl. Jap.," vol. i, Tab. I).—This plant, first pointed out as a distinct species by Siebold, has been included by most previous and succeeding botanists under *I. anisatum*, but differs from it in being from 25 to 30 feet high, *i. e.*, twice or three times the height of *I. anisatum*, in having leaves rather broader above the middle, with a more glaucous or paler under-surface (so far as can be judged from herbarium specimens), and flowers with only 18 or 20 stamens. It flowers in April. The petals, which are yellowish and tinged with red here and there at the margins, appear to be also less in number than in *I. anisatum.* The tree is not a native of Japan, but was introduced from China or the Corèa in ancient times by the Buddhist priests, and planted around the Japanese temples, being used when in blossom for adorning the altars and tombs. The yellowish bark has an aromatic taste, and is used by the Buddhists as an ingredient in their pastilles, which are made to burn a certain length of time, and thus serve as a sort of chronometer. The leaves are considered to be poisonous. The fruit is not used as a spice in Japan, nor for any other purpose, so far as is known. It has recently appeared in English commerce, and from its general appearance and peculiar odor was believed to be the Chinese fruit deprived of its oil by distillation. This fruit is about one-third less in diameter than the Chinese drug, and a few only of the carpels are generally developed to maturity. The curve or depression on the ventral suture near the apex is deeper and shorter, and hence the very short beak appears more erect than in the Chinese drug (see Fig. 73). Neither the pericarp nor the seed has any taste of anise, but possesses a very faint taste and odor, like the oil of *Laurus nobilis*, or distantly resembling the odor of cubebs. The number of carpels is eight, as in the Chinese anise. The seeds vary in thickness according to the degree of ripeness, as in the other species.

FIG. 73.

Illicium religiosum, *Sieb. et Zucc.*

Illicium Parviflorum, Mich.—This species is a native of the hilly regions of Georgia and Carolina, in North America, and is distinguished by its small flowers, with only nine or twelve yellowish, ovate, or subrotund petals. Like the Chinese and Japanese species, the fruit has only eight shortly-beaked carpels. the taste resembles sassafras.

Illicium Floridanum, Ellis.—This is a native of Florida, and differs from the above in having twenty-seven to thirty dark-red petals, and a fruit consisting of thirteen carpels, which resemble those of the Chinese anise in flavor. The fruits of this and the preceding species are not met with in commerce. In Alabama the leaves of *I. florida-*

num are reputed to be poisonous, and the plant has hence acquired the name of the "Poison Bay."

Illicium Griffithii, Hook. f. and Thomson.—A fruit resembling star anise in shape, but having thirteen instead of eight carpels (see Fig. 74), is referred by Mr. Holmes to I. Griffithii. These fruits resemble those of star anise in color, except at the ventral and dorsal sutures, where they are rather darker. When a carpel is chewed, at first no taste is observed, but shortly a bitter taste, with some acridity and a flavor between that of cubebs and bay leaves, becomes perceptible, the bitterness and acridity being the most marked feature. They also appear from the scars on their sides to have been pressed together in the earlier stages of growth, probably from the carpels being more numerous and therefore more crowded. The beak is short and incurved and the terminal depression well marked. *Illicium Griffithii* is a native of East Bengal, growing on the Bhotan and Khasia hills, at an altitude of 4000 to 5000 feet. It is a shrub, with angular, glabrous branches and leaves larger than those of *I. anisatum*, being 2 to 4 inches long and 1 to 2 inches broad, and acute at both ends. The sepals are six and orbicular, and the petals eighteen, the outer being oval and the inner smaller and narrower.

Fig. 74.

Illicium Griffithii, *Hook. f. et Thomson.*

Illicium Majus, Hook. f. et Thomson.—Mr. Holmes identifies a parcel of star anise fruits in the collection of drugs brought by Mr. J. Collins from Singapore to be derived from *Illicium majus*. The fruits are remarkable for their dark-brown or almost black color, and for having from 11 to 13 carpels, which, as in those of *I. Griffithii*, are

Fig. 75.

Illicium majus, *Hook. f. et Thomson.*

very equally developed. The depression near the end of the ventral suture is longer and shallower, so that the short beak appears less incurved (see Fig. 75). The taste has a strong resemblance to mace, but lacks the bitterness so manifest in the fruit of *I. Griffithii. I. majus* is a shrub about 30 feet high, with leaves from 4 to 6 inches long and 1½ to 2 inches broad, the leaves being widest above the middle and evidently acuminate at the apex. The flowers are pink, with about 16 segments, the sepals and petals orbicular, the inner petals being broad and oval, and the filaments broader than the oblong anthers. It is a native of the Thoung Gain range in Tenasserim, at an altitude of 5500 feet.

Mr. Holmes, finally, sums up the following pharmacognostic distinctions:

Carpels 8.	*Illicium anisatum.*	Taste resembling anise.
"	*Illicium religiosum.*	Taste, faint, like bay-leaves.
"	*Illicium parviflorum.*	Taste, like sassafras.
Carpels 13.	*Illicium floridanum.*	Taste, like anise.
"	*Illicium Griffithii.*	Taste, bitter, like bay-leaves and cubebs.
"	*Illicium majus.*	Taste, like mace.

—Phar. Jour. Trans., December 18th, 1880, pp. 489–491.

ANONACEÆ.

Cananga Odorata (Hooker et Thomson).— *Ylang Ylang.* — Professor F. A. Flückiger communicates some very interesting information regarding this plant, and the highly odorous essential oil of its flowers, known in commerce under the name of "Ylang-Ylang oil." The plant has been variously named, *Arbor seguisan* (Ray), *Uvaria odorata* (Dunal), *Unona odorata* (Dunal), *Unona odoratissima* (Blanco), and *Canang odorant* (Lamarck); but the above is now accepted as its proper designation. The very fine illustration (see Fig. 76), accompanying Professor Flückiger's paper, is taken from the magnificent "Flora Javæ" of Blume.

Cananga odorata is a tree growing to the height of about sixty feet, having few but profusely ramified branches. The bifarious, short-petioled, lanceolate-acuminate leaves are to 18 cm. long and about 7 cm. broad; their surface is somewhat rough, but at the lower surface slightly pubescent along the ribs. The handsome and conspicuous flowers are in fascicles, up to four, upon short pedicels. The sepals of the three-lobed, coriaceous calyx are finely recurvate. The six lanceolate petals soon spread out flat and grow to a length of 7 cm. and a breadth of about 12 mm. They are longitudinally veined, of greenish color, but dark-brown when dried. The somewhat campanulate, pendulous flowers present a handsome aspect, though the floral splendor of other nearly related plants is much more prominent.

The filaments are numerous, and the somewhat elevated receptacle is slightly depressed at the vertex. The green fruit (berry) consists of 15 to 20 rather long-pedicelled single carpels, including 3 to 8 seeds, arranged in two rows. The fruits are situated in hemispheric umbels, or arise from the nodes of leafless twigs. The flesh of the fruit is sweetish and aromatic, and the flowers possess an exceeding fragrance, which is frequently compared with that of hyacinth, narcissus, and clove.

Fig. 76.

Cananga odorata.

According to Hooker and Thomson, and according to Bentham and Hooker, *Cananga odorata* is the only species of this genus; the plants formerly confounded with it, under the name of Unona or Uvaria, some of which likewise possess fragrant flowers, are now assigned to the latter two genera. Cananga differs from Uvaria by the valvate sepals, and from Unona by the biseriate arrangement of the seeds.

Cananga odorata is distributed over the whole of Southern Asia, but principally as a cultivated plant. In its wild state, the tree grows to a much greater height, but the flowers are, according to Blume, almost odorless.

The volatile oil first made its appearance in Europe in 1864, and its exceedingly fine aroma found ample recognition both at London and at Paris. Chemically the oil has become interesting by the fact, discovered by Gal, that it contains benzoic acid, no doubt in the form of a compound ether. This occurrence of benzoic ether in a natural product is a solitary instance, as far as it is known to the author, and he therefore requested Mr. Adolf Convert, *Cand. Pharm.*, to examine the oil in this direction, with results that fully prove its presence. Besides a benzoic ether, and probably a phenol, the oil gives indications of the presence of an aldehyde, or ketone. Like the benzoic acid, no doubt the acetic acid is also contained in the oil in form of a compound ether.—New Rem., April, 1881, pp. 98–100. Also Arch. der Pharm., January, 1881, and Am. Jour. Phar., March, 1881.

BERBERIDACEÆ.

Podophyllum Root—Constituents.—Dr. Valerian Podwyssotzki has subjected the rhizome of *Podophyllum peltatum*, L., to examination, and has obtained from it, and from podophyllin:

1. A colorless and difficultly crystallizable and very poisonous substance ($\frac{1}{5}$ milligram being sufficient to kill a cat), of a very bitter taste, only slightly soluble in water, but very soluble in alcohol, the alcoholic solution having a slight acid reaction, and which he calls *podophyllotoxin*.

2. By treating the above substance with aqueous ammonia or hydrate of lime, two further substances, the one crystallizable and chemically indifferent, insoluble in water, but poisonous, which, on account of its intense bitter taste, he calls *pikropodophyllin*; the other, which combines with the alkali employed, and when liberated possesses a strong acid reaction, and is easily soluble in hot water, the author calls *podophyllic acid*.

3. A harmless substance, crystallizing in yellow needles, resembling *quercetin* in its properties.

4. A considerable quantity of a green oil, as well as of a crystalline fatty acid, both toxicologically inert.

In preparing the toxicologically active principles of podophyllum in a pure state, care must be taken to separate out, as far as possible, the substances 3 and 4. The author's method is as follows: Commercial, or self-prepared podophyllin, finely triturated, is placed in a capacious flask, covered with about ten times its volume of chloroform, and the whole digested for some time over a water bath. The chloroform is filtered off from the insoluble residue in the flask, and this treated with a fresh quantity, as long as the washings come over colored and taste perceptibly bitter; as a rule this operation must be renewed six or eight times. The washings are then collected and placed in a distilling vessel, and the chloroform distilled off until the whole has assumed the consistence of a thin syrup. The remainder of the chloroform is then expelled, by evaporation, over a water-bath. (If the distillation is continued too long, the tenaciousness of the mass renders its removal from the distilling vessel very difficult.) The concentrated extract is then lixiviated with petroleum-ether over a water-bath until every trace of fatty matter is dissolved out. The first portions of petroleum-ether are of a deep-green, the last of a light-green color. During the digestion with petroleum-ether the tenacious magma swells up a good deal, and requires constant stirring. In proportion as the fatty matters are extracted, the mass gets more friable, and becomes at last a pale yellowish-gray powder. In evaporating the petroleum-ether washings, a deep-green oleaginous substance is obtained, from which, after a time, a colorless fatty acid crystallizes out, the mother liquid consisting of a green, unpleasant-smelling oil. The author has not examined the chemical nature of these two substances, since he found them to be toxicologically inactive. Petroleum-ether, therefore, dissolves out no active principle from podophyllum, while the chloroform extract is extremely rich in such.

The substance resembling quercetin, found in podophyllum, and which is likewise toxicologically inactive, being insoluble in chloroform, does not pass into the chloroform extract. The extraction with chloroform and then with petroleum-ether is, therefore, the best and directest way of getting at the active principles of podophyllum. The author is engaged in examining the chemical constitution of these active principles, and reserves an account of his researches in this direction for a future paper.

The author made experiments with podophyllotoxin and pikropodophyllin. Podophyllotoxin is the most rapid in its effects. This substance, on account of its comparative solubility, admits of being subcutaneously injected, while pikropodophyllin can only be applied internally given in oil. The author's researches made with these two substances lead him to conclude that the effect is no mere local one, and that, besides their emeto-cathartic properties, they act very powerfully on the nervous system.—New Rem., February, 1881, pp. 47, 48.

Podophyllin—Constitution.—L. Guareschi has examined the podophyllin of commerce obtained from *Podophyllum peltatum*, and finds it to consist of two substances, a resin soluble in ether, and a glucoside which is not soluble in ether. This glucoside is decomposed by the action of emulsin, or when boiled with dilute sulphuric acid; in the latter case, the solution on cooling deposits a white powder, whilst the sugar remains dissolved. The product of the decomposition of the glucoside is soluble in alcohol and also in boiling water, being deposited again as the solution cools; it has not been examined. When commercial podophyllin is fused with potash and treated in the usual way, it yields a small quantity of a product which seems to contain hydroxysalicylic acid, parahydroxybenzoic acid, and pyrocatechol. The author considers that the glucoside in podophyllin resembles convolvulin and turpethin.—Phar. Jour. and Trans., August 7, 1880, p. 114, from Jour. Chem. Soc., and Gazz. Chim. Italiana.

Podophyllin—Peculiar Effect on the Sense of Taste.—A correspondent of the "Lancet" calls attention to the effects of podophyllin on the sense of taste when taken in small repeated doses. Patients taking it in this way have declared they could not distinguish one food from another. A gentleman who took the remedy in doses of $\frac{1}{30}$ of a grain thrice daily, found after the third dose that his tongue and neighboring glands were greatly swollen, there was profuse salivation and entire abolition of the sense of taste.—New Rem., January, 1881, p. 21.

RUTACEÆ.

Simaba Waldivia and S. Cedron—Bitter Principles.—Ch. Tanret has isolated the bitter principles from the fruits of these plants, and finds that from *S. Waldivia*—which he has named *waldivin*—to be crystalline, while that from *S. Cedron*—which he names *cedrin*—is amorphous, and showed not the slightest sign of crystallization. Lewy had previously (in 1851) obtained from *S. Cedron* a crystalline bitter-principle, to which he had given the name cedrin; but Tanret expresses the opinion that the fruits must have been admixed with those of the waldivia.

Waldivin is a neutral principle, forming readily crystals which have the composition represented by the formula, $C_{36}H_{24}O_{20}.5H_2O$, losing the water of crystallization when heated to 110° C. Its crystals are hexagonal prisms; their sp. gr. is 1.46. It is sparingly soluble in cold water (600 parts at 150° C.), but discolors in 30 parts of boiling water, acids and salts increasing its solubility considerably, and its aqueous solutions froth considerably upon agitation. It dissolves in 60 parts of 70 per cent. alcohol at 15° C., but requires 190 parts of absolute alcohol, while chloroform dissolves it abundantly, and ether not at all. It possesses an extreme bitterness. Alkalies decompose waldivin with great facility; the bitterness is destroyed completely, and the solution reduces Fehling's solution. Not being able to produce fermentation, however, the presence of glucose cannot be affirmed by the author. The process of the preparation of waldivin consists in extraction of the finely powdered fruit with 70 per cent. alcohol, concentrating the tincture, and shaking the extract while still warm with chloroform; the residue of evaporation from the chloroformic solution is purified by crystallization from boiling water. The yield was 1 part from 1000 parts of badly preserved fruit, but the author thinks that as much as 8 parts might be obtained from the same quantity of recent and dried waldivias.

Cedrin was obtained from cedron fruits by a modification of the above process. It formed a yellow varnish-like mass, which is very soluble in water, and shows a superb greenish-yellow fluorescence even in very dilute solutions. Like waldivin it is exceedingly bitter; but this is not completely destroyed by alkalies. The substance does not appear to be of guaranteed purity, and further researches are necessary.—Am. Jour. Pharm., February, 1881, p. 72; from Bull. gén. de Thérap., 1880, pp. 504–506.

Jaborandi—Assay.—Dr. A. Poehl finds the usual methods for the quantitative determination of alkaloids in plants to be unsatisfactory when applied to jaborandi leaves, and recommends the following:

After being cut, they are infused in hot water containing 1 per cent. of hydrochloric acid; the infusion is precipitated by basic acetate of lead, and the filtrate from this mixed with hydrochloric acid until no more chloride of lead is thrown down. From the filtered liquid the *pilocarpine* is now precipitated by adding an excess of phosphomolybdic acid, the precipitate is washed with water containing hydrochloric acid, dried at 100° C. and weighed. 100 parts of the phosphomolybdate correspond to 45.66 parts of pilocarpine.

The pilose leaves of *Pilocarpus officinalis* (a species the existence of which has been assumed by Dr. Poehl on the basis of anatomical differences from the leaf of *P. pennatifolius*, but which still requires confirmation) yielded, on an average, 1.97 per cent. pilocarpine by this method; the hairless leaves, 1.86 per cent.; the bark of branches and stem, 0.408 per cent. On the other hand, the leaves of *Pilocarpus pennatifolius* yielded only 0.159 per cent.

Before the tincture can be assayed in this manner, the alcohol must be gotten rid of. The infusion may be at once used as such, but the extract must be dissolved in acidulated water.—New Rem., February, 1881, p. 50; from Phar. Zeitsch. f. Russl. 1880.

LINACEÆ.

Linseed Meal—Assay of Oil.—Mr. Otto Kaspar had occasion to examine some linseed meal of doubtful quality, but found it to yield

17.35 per cent. of fixed oil, by the method below given, by which method also he obtained from four samples of linseed, powdered by himself, 17.15, 17.60, 17.45, and 17.35 per cent. respectively. The result is interesting, inasmuch as the percentage of oil is usually given higher. Hager (Pharm. Praxis) gives 25 per cent. when the powder is completely exhausted, and the author considers it possible that he might have obtained a similar result had he exhausted the powder completely. The following was his method of extraction: 2 grams of the powder were shaken in a vial with 10 grams of ether, occasionally for half an hour. The mixture is at once brought upon a filter, and the filtrate collected in a tared porcelain crucible and allowed to drain completely, the ether evaporated in a water-bath and weighed. For comparative purposes this method is, in the opinion of the author, sufficient.—Schweiz. Wochenschr. f. Pharm., October 15, 1880, p. 382.

AURANTIACEÆ.

Lemons—Preparation of Oil and Citric Acid in Greece.—Dr. X. Landerer states that millions of lemon trees are growing on the islands of the Grecian Archipelago, on Chios, and in the Peloponnesus, while lemon groves extend far and wide on the island of Paros. Some years ago the disease which destroyed so many thousands of these beautiful trees in Sicily appeared in Paros, and hundreds of laborers lost their occupation. Soon after this misfortune, Sicilians came to Greece and introduced in Paros their native methods of extracting the essential oil of lemons, by the sponge and *écuelle* processes. They also prepared the lemon-juice by evaporating it to a syrup, and the product, called *succo agro*, was exported to Italy. From carelessness and ignorance on the part of the workmen, the juice was in great part decomposed and rendered useless by overheating.—Chem. and Drug., February, 1880, p. 66.

Lemon Juice—Conservation.—Judicis ("Mém. de Méd. et de Pharm. Milit.") has treated lemon-juice in various ways, with a view to determining the best manner of its preservation:

1. Filtering the juice, before any fermentation has set in, and filling it in bottles well corked.

2. Heating the fresh juice in a closed vessel to 100°.

3. Adding 10 per cent. of alcohol 85° to the fresh juice and then treating as under 2.

4. Fermenting the juice and filling it in bottles, without heating or addition of alcohol.

5. Fermenting the juice and treating it as under 2.

6. Fermenting the juice, adding 10 per cent. alcohol, and treating as under 2.

The juice so treated was exposed for eight months in a room freely exposed to the summer sun, and each sample kept perfectly well. It appears, therefore, unnecessary to treat lemon-juice in any other way than to simply filter it while fresh and to store it in well-stoppered bottles. The filtration, however, proceeds very slowly, and hence the preservation by the addition of 10 per cent. of alcohol to the unfiltered juice is the preferable way.—Zeitschr. Œst. Apoth. Ver., October 20th, 1880, p. 467.

VITACEÆ.

Raisins—Preparation in California.—In Mr. Blower's vineyard, Yolo County, the grapes are allowed to remain on the vine until of a golden color and translucent. They are then picked and put on wooden trays, two by three feet in size, placed between the rows, sloping to the sun. When half dried they are turned by putting a tray on top, and by inverting them both, are transferred to the new tray. When the new grapes lose their ashy appearance, and after removing the green ones, the rest are put into large sweat-boxes, placing sheets of paper between every twenty-five pounds of raisins. They are left there for two weeks, when the stems are tough and the raisins soft. The packing follows, in which iron or steel packing frames are used, the raisins being assorted, weighed, inspected, and made presentable. Mr. Blowers prefers a rich, moist, sandy loam, in a warm climate, for raisins, and believes that winter irrigation will destroy insects and keep the vines in a thrifty condition. He prefers to plant vines eight by ten feet apart, or even ten by ten feet, and uses fertilizers.—New Rem., May, 1881, p. 148.

PAPAVERACEÆ.

Opium—Cultivation in Asia Minor.—Karl v. Scherzer, Austrian Consul-General at Smyrna, gives some valuable information relative to the culture and commerce of opium in Asia Minor. The following is extracted from "New Rem." (January, 1881, pp. 8–10):

Opium requires a sandy clay soil, which must not have lain fallow, but be prepared for this crop the year before. If the land has not been already manured, it should be well fertilized with stable manure, and ploughed twice, the second time at right angles to the first. The seed is put in the second furrow, which should not be too deep. In order to cover the seed lightly, a tree, with all its branches, is dragged across the field thus tilled, by oxen. But care must be taken that the soil does not become too wet in the interval between the cultivation and the sowing, and that the covering is but light. The light-colored seeds are preferred, that is those which are yellow or white. They produce plants with white and yellow flowers, and vigorous poppies, which yield an abundant juice and a clear gum, while the gray or black seeds, which have blue and dark-red flowers, have small heads, contain less juice, and give a dark-colored opium. Moreover, chemical analysis shows that light-colored opium contains more morphia than dark. They reckon about $\frac{3}{4}$ pound (fiscal pound) of poppy-seed for each *dunum*, which before being sown must be mixed with four times the quantity of sand or fine earth, so that the ground may be evenly sown in equal proportions, which would be difficult with the seed alone. The end of October and the beginning of November are considered most favorable for sowing, especially when the fine weather following the first rain has prepared the ground for cultivation. The sowing is done exactly the same as for poppies in European gardens. The germination takes about fifteen days. Should frost occur, and the seeds not open on account of the earth being covered with a hard crust, the land is cultivated and sown again at the end of November or the beginning of December. While winter lasts, the plant remains small, and grows only by the root, which, in a well-pulverized soil, becomes strong and does not even suffer from night frosts, even if the plant itself was injured. When spring comes, the development is rapid, according to the vigor of the root and the success of the seedlings. The plant is then trimmed and thinned; weeds are destroyed, and poppy stalks, when too crowded, also. Sometimes when weeds grow afresh, a second weeding is necessary. The plant then increases rapidly and puts forth from one to four stalks, three or four feet high, which flower at the end of April or the beginning of May. The poppy heads come to maturity about fifteen days after the flowers fail. Its ripeness is tested by gentle pressure with the finger. The ripe poppy-head is soft; when green it is hard. One must learn to perceive the ripeness at the proper time, for the incisions should then be made immediately. The harvest itself should be gathered in a few days; otherwise the overripe poppies, that is to say, ripe poppies left unpicked for six or eight days, give no juice.

"The incisions are made in the afternoon with a small curved knife. The incision is made half way up the head and around it. To this end the poppy is grasped with the thumb and forefinger of the left hand, and half the incision made with the right, after which, without otherwise shifting one's position, the poppy is slightly turned round, and the incision completed. As soon as the blade (which should never penetrate the capsule, for if this be cut through, the juice is lost) enters, the white juice of the poppy escapes and flows about the cut. It is then left to dry in the sun in its place for six or eight hours. By this time it will have thickened, and changed to a yellow resinous substance, which later on becomes a reddish-brown. It is then taken off with a knife and kneaded into spherical cakes of various sizes, seldom weighing more than two pounds (fiscal) each. These cakes, wrapped in poppy leaves, are dried in the sun for several days. The cakes while yet soft are packed in baskets, or in little osier packages lined with cloth. To prevent the cakes from becoming disfigured, or sticking to one another, they are always dusted over with the dry fruits of a species of *Rumex.* To get in the crop of five *dunums*, a harvest which we have before said must be quickly gathered, requires ten laborers. The average yield of a *dunum* is estimated at four pounds (fiscal) or thereabouts.

"In Asia Minor the cultivation of opium is only successful in the valleys of Kutaja, Ushak, Karahissar, Balikesri, Afium, Sparte, and Konijah, which are mostly protected from cold winds by high mountain ranges, and where the deep soil, adapted for wheat, is especially suitable for the poppy. The principal arrivals from the interior reach Smyrna at the end of July or the beginning of August. Fresh opium is too heavy for sale. The older opium, which is dry, and therefore costs more, is preferred."

Opium—Morphiometric Methods.—Professor Albert B. Prescott and Joseph F. Geisler communicate the results of their experiments with four morphiometric processes, viz.: Hager-Jacobsen's, as modified by Professor Prescott (Proceedings, 1878, p. 807); Flückiger's lately proposed process (Proceedings, 1879, p. 170); the well-known process of Dr. Staples (the U. S. P. process); and a modification of the latter. The authors forbear to discuss the best choice of methods, and content themselves with giving their manipulations and results, which are profitably consulted in New Rem., December, 1880, pp. 256–258.

Opium—Colorimetric Method of Assay.—Dr. E. Mylius recommends the following method for the assay of morphia in opium, which is dependent on the color produced by iodic acid. It is not as delicate as other methods, but being correct within 0.5 per cent., it answers particularly well for the purposes of pharmacy. Moreover, it is economical, requiring only small quantities of both material and reagent. The only special apparatus required are two (or more) glass tubes, closed at one end, 16 cm. long, and 1.5 cm. internal diameter. These are graduated, so that 5, 10, 15 and 20 cc. can be read off, the last 5 cm. being divided into fractions of one-fifth cm. (= 25 equal divisions). The test is then made as follows: 0.5 grams of the opium (in powder) is boiled with about 10 grams of water in a flask of 50 cc. capacity, mixed with three grams of solution of subacetate of lead, brought to the measure of 50 cc., shaken, allowed to cool, and filtered. 15 drops of concentrated (or the equivalent quantity of dilute) sulphuric acid are now added, and the mixture again filtered, observing that the filtrate is *absolutely clear.* For comparison with this liquid, a solution of 0.1 gram of morphia with 3 grams of diluted sulphuric acid in 100 cc. of water is made. The reagent, iodic acid, is best used in solution with an equal weight of water, and for the purposes of the test it need not be absolutely free from nitric acid. Iodate of potassium and sulphuric acid may likewise be used. Everything being in readiness, 5 drops of the concentrated solution of iodic acid (or 8 to 10 centigrams of iodate of potassium and 2 drops of concentrated sulphuric acid) are placed in each of the two tubes described above; then 5 cc. of rectified bisulphide of carbon are added, and finally into the one 10 cc. of the opium solution, into the other 10 cc. of the morphia solution, the tubes are corked. and well shaken for two to three minutes by the clock (if iodate of potassium is used, three to four minutes), and then set aside until the bisulphide of carbon has settled clear, requiring from one to two minutes. On a comparison of the color reaction, if it is of identical density, the opium contains just 10 per cent. of morphia; if the one or the other is denser, then the denser fluid is diluted carefully with bisulphide of carbon until the colors are of identical density, observing that before such addition the liquid within the tube measures just 15 cc. The quantity thus added gives figures from which the greater or less strength of the opium solution is readily calculated, each $\frac{1}{5}$th cc. division indicating $\frac{1}{25}$th greater or less percentage than is indicated when the colors are at first of identical density. The method is equally applicable to the assay of morphia in the various galenical opium preparations. using of these the quantities that correspond to 0.5 gram opium.—Phar. Centralh., March 3 and 10, 1881.

Opium—Preparation for Smoking.—Hugh McCallum, government analyst at Hong Kong, gives the following interesting particulars regarding the preparation of opium for smoking purposes:

The boiling operations are carried on in a moderate-sized building; over eighty Chinese coolies and a few Indian watchmen are employed, all of whom live on the premises. The majority sleep in a loft immediately above the boiling-rooms, the others in a room on the ground floor, which also does duty as a kitchen, mess room and general store, and is in open communication with the boiling-rooms. The employés may therefore be said to live in an atmosphere saturated with the odor of opium, yet all seem in good health. The boiling is conducted in two rooms in open connection with each other, one being set apart for the first boiling, the other for the final. The first boiling-room has a row of furnaces on each side, with a few rows running transversely between them; the other has four rows, extending along the whole length of the room. The furnaces are made of a kind of fireclay, and are of two sizes, the large size having a diameter of about 24 inches, the small a diameter of 18 inches, the depth of each being about 9 inches; they are built in with brick; the fuel used is wood charcoal. The pans in which the opium is boiled are made of some kind of copper alloy, and are of two sizes, so as to fit the furnace, their shape being somewhat like a shallow, evaporating-dish. The opium is sent every day from the hong (*i e.*, shop or firm), to the boiling-house, the previous day's boiling being then returned to the hong. The average quantity boiled each day is from six to eight chests of Patna opium, this being the only kind used. The opium is removed from its covering of leaves, moistened with a little water, and allowed to stand for about fourteen hours; it is then divided into pans, 2½ balls of opium and about 10 pints of water going to each pan; it is now boiled and stirred occasionally, until a uniform mixture, having the consistence of a thin paste, is obtained. This operation takes from five to six hours. The paste is at once transferred to a larger pan and cold water added to about 3 gallons, covered and allowed to stand for from fourteen to fifteen hours. A bunch of *tang suin* (lamp-wick, the pith of some plant), is then inserted well into the mass, the pan slightly coated, when a rich clear brown fluid is thus drawn off and filtered through *chi mui* (paper made from bamboo). The residue is removed to a calico filter and thoroughly washed with boiling water, the wash water being reboiled and used time after time. The last washing is done with pure water; the washings are used in the next day's boiling. The residues on the calico filters are transferred to a large one of the same material and well pressed; this insoluble residue, called *nai chai* (opium dirt), is the perquisite of the head-boiling coolie, who finds a ready market for it in Canton, where it is used for adulterating, or rather in manufacturing the moist inferior kinds of prepared opium. The filtrate or opium solution is concentrated by evaporation at the boiling-point, with occasional stirring, until of a proper consistence, the time required being from three to four hours; it is then removed from the fire and stirred with great vigor till cold, the cooling being accelerated by coolies with large fans. When quite cold it is taken to the hong and kept there for some months before it is considered in prime condition for smoking. As thus prepared it has the consistence of a thin or treacly extract, and is called boiled or prepared opium. In this state it is largely exported from China to America, Australia, etc., being carefully sealed up in small pots having the name of the maker (*i. e.*, hong) on each. The Chinese recognize the following grades of opium: (1) "Raw opium," as imported from India. (2) "Prepared opium," opium made as above. (3) "Opium dross," the scrapings from the opium pipe. This is reboiled and manufactured as a second class prepared opium, but is said (on Chinese authority) to be more poisonous than ordinary prepared opium. Whatever may be thought of the above process, there can be no doubt but that it has been found after long experience to yield the drug in the most approved form for smoking. —Phar. Jour. Trans., September 18, 1880, p. 229.

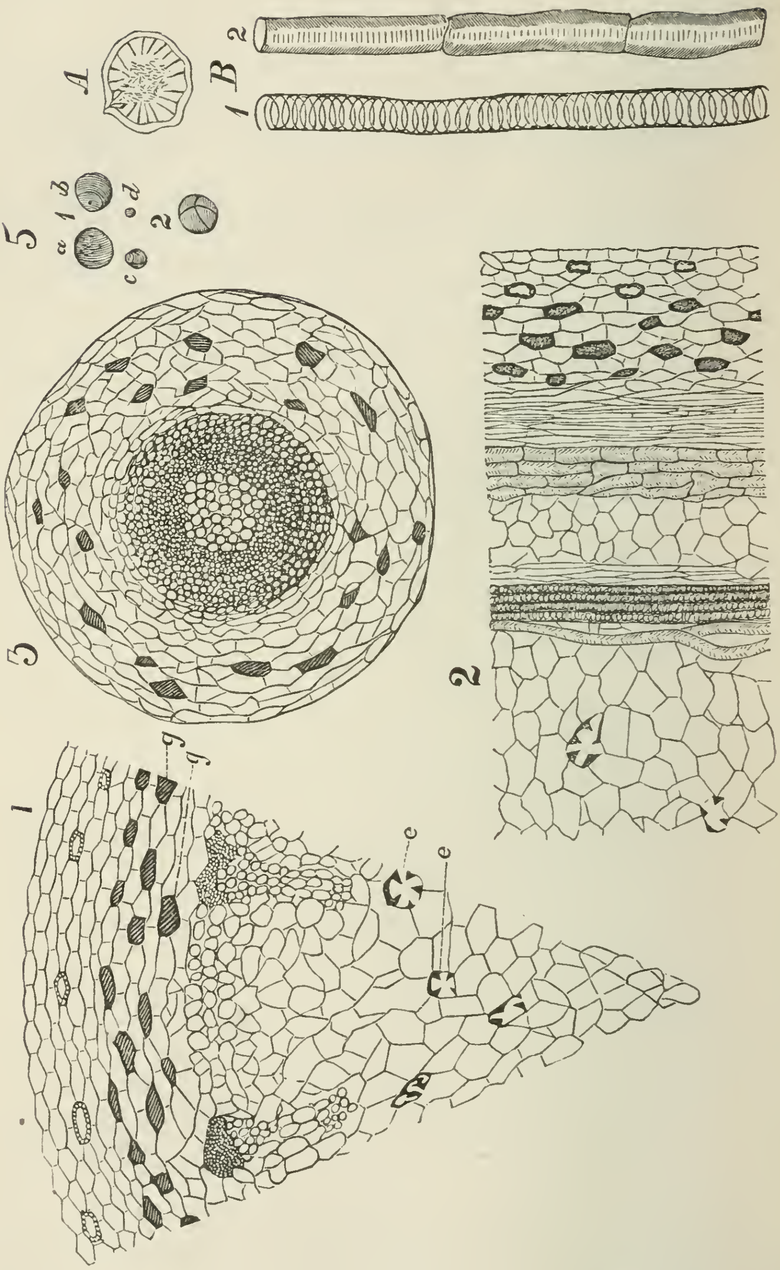
Opium—Trade in the United States.—Mr. R. F. Fairthorne communicates an interesting paper on the trade in opium and morphia in the United States, which contains some valuable information, chiefly of a statistical character.—Am. Jour. Phar., December, 1880, p. 614.

Sanguinaria Canadensis—Microscopical and Chemical Examination of the Rhizome.—Mr. Frank L. Slocum gives the following description of the microscopic structure of the rhizome of *Sanguinaria canadensis* (see Fig. 77). A cross-section of the rhizome (1) shows the general arrangement of the fibro-vascular bundles, which are situated in a double circle three-fourths of the distance from the centre to the exterior. Outside of the xyleme the parenchyma is rather compressed; the eight or ten external rows of cells are generally quite devoid of starch, and contain a few resin cells, *g g.* The fibro-vascular bundles in the outer circle are composed of about twelve vessels each, shortly jointed, and their course is exceedingly difficult to trace. They are all of one class, namely, pitted vessels; the sieve-tubes are few, and nearly all situated in the outer portion of the fibro-vascular bundles. The fibro-vascular bundles in the inner circle are smaller, the vessels are longer, and their course is quite easily traced; the sieve-tubes are in the same position as in the outer row of bundles. Inside of the circle of fibro-vascular bundles, and between them, is loose parenchyma, filled with starch; the cells, *e e*, containing the red juice, are shown with the juice dried and adhering to the cell-walls.

The structure of a longitudinal section (2) may be understood from the above explanation of the cross-section. A transverse section of a rootlet is shown by (3); the vessels are seen to be closely aggregated in the centre, surrounded by sieve-tubes, which, as they become more removed from the vessels, are of somewhat, but slightly, increased diameter. Outside of the nucleus sheath the structure consists of parenchyma, flattened and elongated, and containing resin cells. A longitudinal section of a rootlet is shown by (4), while (5) shows the starch-granules highly magnified, probably two-thirds of the granules being of the size 1, *a b*, while the remainder are of the size 1, *c d*. The granule 1-*a* measures 0.022 mm., while the smaller granules measured 0.0032 mm. 2 shows the appearance of a granule under polarized light.

A transverse section of the rhizome, of natural size, is shown by *A*, while *B* 1 and 2 represent two ducts much magnified: 1 being a spiral duct from a rootlet; 2, a dotted duct from the rhizome. The external layer of cells in both rhizome and rootlet do not differ materially from the others, being only slightly flattened.

FIG. 77.

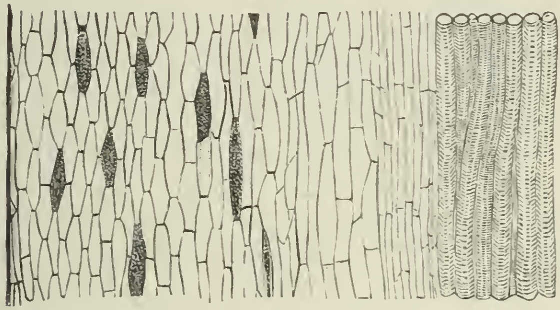


SANGUINARIA CANADENSIS.—*A*, Transverse section of rhizome, natural size. *B*, Ducts: 1, spiral; 2, dotted. 1, rhizome, transverse section, magnified; 2, longitudinal section, magnified; 3, rootlet, transverse section, magnified; 5, starch-granules, highly magnified.

The chemical examination of the rhizome was mainly confined to a study of the resins and of precipitates which form in the liquid galenical preparations; though the coloring matter,—of which two exist, one precipitable by normal the other by basic acetate of lead,—and the second (colorless) alkaloid received some attention. By treating the alcoholic extract with acidulated water, and thoroughly washing the residue with distilled water, 985 grains of dry resin were obtained from 4 pounds avoirdupois of the powdered rhizome. This resin is of a dull pale-red color, slightly sternutatory, has an acrid taste, and is of a waxy consistence. In doses of from 2 to 4 grains it is a nauseant, reducing the pulse and producing uneasiness in the stomach. It is, therefore, not an unimportant constituent of the rhizome, a fact which was already noted by the late Professor R. P. Thomas (see Proceedings, 1863, p. 214). The resin was dissolved in boiling alcohol, when on cooling about 10 per cent. of the resin precipitated as a dull brown substance, which the author designates (X), while that remaining in solution is designated as (Y). The latter is of a bright-red color, of extract-like consistence, has a slight taste, and colors the saliva. Their behavior to solvents, etc., was found to be as follows:

FIG. 78.

4



SANGUINARIA CANADENSIS.—4. Rootlet, longitudinal section, magnified.

	Resin (X).	*Resin* (Y).
Ether, ...	Sparingly soluble, hot or cold.	Very sparingly soluble, hot or cold.
Chloroform, . . .	Sparingly soluble, hot or cold.	Soluble, hot or cold.
Water, ...	Sufficient to color only, hot or cold.	Scarcely colors, hot or cold.
Bisulphide carbon,	Sparingly soluble, hot or cold.	Soluble hot, sparingly soluble cold.
Benzol, ...	Sparingly soluble hot, less sol. cold.	Soluble hot, sparingly soluble cold.
Gasolin, ...	Sparingly soluble, hot or cold.	Insoluble, hot or cold.
Sol. of potassa, . .	Sparingly soluble hot, less sol. cold.	Sufficient to color, hot or cold.
Ammonia, . . .	Very sparingly soluble, hot or cold.	Sparingly soluble hot, insoluble cold.
Hydrochlor. acid,	Soluble hot, sparingly soluble cold.	Soluble hot, sparingly soluble cold.
Incineration, . .	No ash.	Ash.

The author obtained precipitates, formed in liquid preparations of sanguinaria on standing, from several manufacturers. He found them without exception to contain notable quantities of sanguinarina. Among all the solvents tried none would prevent the gradual precipitation, but alcohol seemed to be the best by far, since it not only holds the sanguinarina and resin (better? Rep.) in solution, but it extracts the resin more completely from the drug.—Am. Jour. Pharm., June, 1881, pp. 273–279.

CRUCIFERÆ.

Black and White Mustard—Analysis.—Charles H. Piesse and Lionel Stansell have subjected white and black mustard seed, both in the entire state and in the form of farina of various grades, to analysis. The latter is obtained by crushing the seeds between rollers, then powdered and sifted. The residue in the sieves is called dressings; what passes through is farina or flour of mustard. This is resifted, yielding three qualities: (*a*), superfine; (*b*), fine; and (*c*), seconds. The farina of black and white mustard differs but little in appearance, the brown being, however, slightly darker. The authors weighed samples of the seeds subjected to analysis, and find that 170 white seeds (Yorkshire) to 172 (Cambridge) weigh 1 gram, while it takes 944 black seeds (Cambridge) to make 1 gram. The method employed in the analyses is given, but it is not necessary to give this in detail. It is interesting to note that the yield of volatile oil is greater when the brown (black) mustard is mixed with some of the white. The determination of the volatile oil was based upon the quantity of *thiosinamin* produced (by the union of one molecule of ammonia with one molecule of mustard oil) when the distillate is collected in a receiver containing ammonia in excess. The following table shows the results:

Analysis of Mustard.

White Mustard.	Whole Seeds.		Mustard Farina.		
	Yorkshire.	Cambridge.	Superfine.	Fine.	Seconds.
Moisture,	9.32	8.00	0.30	5.78	6.06
Fat,	25.52	27.51	37.18	35.74	32.55
Cellulose,	10.52	8.87	3.90	4.15	9.34
Sulphur,	0.99	0.93	1.33	1.22	1.26
Nitrogen,	4.54	4.49	5.05	4.89	4.25
Albuminoids,	28.37	28.06	31.56	30.56	26.56
Myrosin and Albumen,	5.24	4.58	7.32	6.67	6.11
Soluble Matter,	27.38	26.29	36.31	36.60	33.90
Volatile Oil,	0.06	0.08	0.03	0.04	0.03
Ash,	4.57	4.70	4.22	4.31	4.30
" soluble,	0.55	0.75	0.44	0.55	0.33

BLACK MUSTARD.	WHOLE SEEDS.	MUSTARD FARINA.		
	Cambridge.	Superfine.	Fine.	Seconds.
Moisture,	8.52	4.35	4.52	5.63
Fat,	25.54	36.96	38.02	36.19
Cellulose,	9.01	3.09	2.06	3.26
Sulphur,	1.28	1.50	1.48	1.30
Nitrogen,	4.38	4.94	5.01	4.31
Albuminoids,	26.50	29.81	30.25	26.06
Myrosin and Albumen,	5.24	6.46	6.78	6.14
Soluble Matter,	24.22	31.64	32.78	31.41
Volatile Oil,	0.473	1.437	1.500	1.381
Potassium Myronate,	1.692	5.141	5.366	4.940
Ash,	4.98	5.04	4.84	4.91
" soluble,	1.11	1.01	0.98	0.77

The white mustard differs in composition from the brown chiefly in not yielding volatile oil, in the fact that the sulphur is lower, and the soluble matter higher in the former than in the latter. Characteristic tests are: 1. The aqueous extract of white mustard yields with ferric chloride a deep blood-red coloration; this reaction is so slight as to be scarcely apparent with a similar extract of black mustard. 2. The aqueous extract of white mustard acquires in a few hours a powerful odor of sulphuretted hydrogen; that of the black mustard smells only of the pungent mustard oil. The yield of mustard oil from black mustard, as the result of over forty experiments, gave the following averages:

Whole mustard seeds,	0.473
Brown farina, superfine,	1.437
" " fine,	1.500
" " seconds,	1.381

The ash consists mainly of potassium, calcium, and magnesium phosphates, with a very minute proportion of chlorine, and there is practically no difference in this respect between the two varieties.—Phar. Jour. Trans., November 20th, 1880, pp. 416–418.

SAXIFRAGACEÆ.

Hydrangea Arborescens—Examination of the Root.—Mr. Jacob Bauer has subjected the root of this plant to examination, and determined the presence of a resin soluble in ether, a resin insoluble in ether, probably an alkaloid, and a crystalline compound, the nature of which was not determined; also tannin, gum, sugar, coloring matter, and 4.33 per cent. of ash.—Am. Jour. Phar., April, 1881, pp. 157–159.

TURNERACEÆ.

Damiana—Distinction of Commercial Varieties.—Messrs. J. U. and C. G. Lloyd have contributed an interesting paper on damiana, in which the distinctive characters of the three varieties of the drug at present found in the market are well described. The authors maintain that the true damiana, the kind originally introduced, is derived from *Turnera aphrodisiaca*, Ward and Vasey; California damiana, as described by Mr. E. M. Holmes, is obtained from *Turnera microphylla*, D. C.; and a second kind of California damiana has lately made its appearance in the market, which is also derived from a species of *Turnera*. The most common damiana of the market, however, is not a *Turnera* at all, but is obtained from *Aplopappus discoideus*, D. C. This spurious damiana possesses well-marked characters, which distinguish it readily from the damianas obtained from species of Turnera; but being much cheaper than the true damianas, it is apt to be foisted upon those who simply regard cheapness and the name damiana, when purchasing. The description of these various drugs is aided by carefully executed wood-cuts.—New Rem., August, 1880, pp. 228–230.

Damiana—Chemical Examination.—Mr. Henry B. Parsons contributes an interesting paper, which is based upon an analysis of the true damiana, *Turnera aphrodisiaca*, Ward and Vasey, published in the report of the U. S. Department of Agriculture (1878, pp. 130 and 131). This analysis is as follows:

Moisture, at 115–125° C.,	9.06	Bitter substance,	7.08
Ash, by combustion,	8.37	Gum,	13.50
Chlorophyll, soft resin, volatile oil,	8.05	Starch isomers,	6.15
Hard, brown resin,	6.39	Acid and alkali extracts,	10.02
Sugar, color, and extractive matter,	6.42	Albuminoids,	14.88
Tannin,	3.46	Cellulose,	5.03
Total,			98.42

Mr. Parsons has since then duplicated many of the above results, and is satisfied of their approximate accuracy. He is of the opinion that the medicinal activity of damiana must be sought for in the volatile oil; the soft resin; the hard, brown resin; the bitter substance; the gum; and, possibly, the tannin-like acid.

The *volatile oil* is present in amount apparently not exceeding 0.2 per cent. It was not separated in sufficient amount for an extended examination, but seems to resemble in its odor and other properties the terebinthinate oils. The *soft resin* seems rather to be an oleoresin in consistence, but does not allow of further division by solvents. When freed from chlorophyll it is brown, semi-solid, has a very acrid terebinthinate taste, is freely soluble in 80 or 90 per cent. alcohol, in chloroform, ether, bisulphide of carbon, benzol, and petroleum naphtha. Dilute ammonic or potassic hydrates do not readily dissolve it. The *hard. brown resin* is freely dissolved by alcohol, but is insoluble in the other above-mentioned solvents of the soft resin. It is nearly tasteless, melts at about 85° C., is saponified by dilute ammonic and potassic hydrates, and is probably composed of two resins, and perhaps a little brown coloring matter. The *bitter substance* is amorphous, light brown, apparently not a glucoside, and contains no nitrogen. Its bitterness is not unpleasant nor very persistent. Water and alcohol dissolve it freely; in ether, chloroform, benzol, petroleum naphtha, and bisulphide of carbon it is insoluble. Repeated experiments failed to separate it in the crystalline form, nor could it be deprived of color by thorough treatment with animal charcoal. The *gum*, which is precipitated from the aqueous extract of the leaves by alcohol, is white, but by contact with air soon becomes inky black. The *tannic acid*—one of the so-called "tannic acids"—gives a greenish-brown color with ferric salts, but possesses no marked astringency. There seems to be also minute quantities of volatile and non-volatile acids present, which, together with a body producing a purplish color with persalts of iron, are not included in the above analysis.

Mr. Parsons considers it probable that alcoholic preparations of damiana may be irritating in many cases, because they contain the soft resin, while aqueous extracts are probably tonic because they contain the bitter extractive, which he has experimentally proved to have marked tonic effects in several cases. At the same time, the alcoholic extracts may possibly be more useful where they can be borne by the stomach.—New. Rem., September, 1880, pp. 261, 262.

MYRTACEÆ.

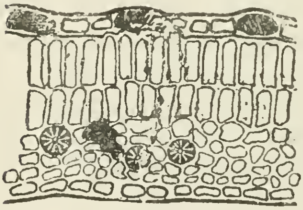
Myrtle-berries—Uses in Greece.—Professor X. Landerer observes that the fresh black berries of the common myrtle are used in Greece as a popular remedy for blennorrhœa. They contain an oleoresin and a considerable quantity of tannin.—New Rem., August, 1880, p. 231.

SALICARIACEÆ.

Henna (Leaves and Powder from Lawsonia Alba)—Microscopical and Chemical Examination.—Dr. Heinrich Paschkis has submitted the powder used by Persians, Arabs, and Egyptians as a cosmetic, and known under the name "henna al henna" ("chenna"), to a close investigation. For this purpose he used three authenticated specimens of the powder, as well as two kinds of leaves, one coming from Persia and corresponding to herbarium specimens of *Lawsonia alba*, Lam. (*L. spinosa* and *L. inermis*, Lin.), the other from Senegal, which are only distinguishable from the others by being larger.

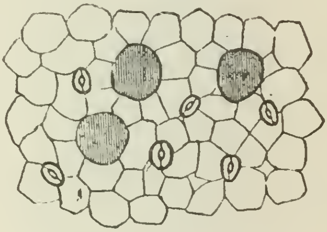
The *Persian leaves* are ovate, acute, mucronate, disappearing at the base into the short petiole. In length they attain 2 cm.; their greatest breadth is 1 cm. The margin is entire, somewhat revolute. The coriaceous shining upper surface is greenish-brown; the under side is rather lighter colored. There is one principal nerve, the lateral nerves anastomosing not far from the margin. Under the microscope (see Fig. 80), the epidermis of the upper side is seen to consist of polygonal cells, crowded together, leaving between them an extraordinary number of stomata. Among the epidermic cells occur, in tolerable abundance, but irregularly distributed, single cells, which are remarkable on account of their size and the strongly refractive property of their contents (mucilage). These appear equally striking in a transverse section of the leaf (Fig. 79). The mesophyll consists under the upper surface of a double palisade layer, and below that of cells containing chlorophyll crowded together. Among the cells occur numerous rosettes of oxalate of lime. The epidermis of the under side scarcely differs from that of the upper; an almost equal number of stomata occur in it. In solution of potash, a section uniformly assumes a beautiful yellow color. Chloride of iron reveals in the mesophyll a tannin, turning green with salts of iron; the epidermic cells, also, with the exception of the protoplasm cells, easily turn green. The microscopic sugar test gives a negative result, as also treating with chloride of zinc, which only colors the epidermis violet. Leaves kept a long time in alcohol become a somewhat pale-reddish color; under the microscope, sections treated with potash solution appeared of a very beautiful delicate rose color.

FIG. 79.



Lawsonia Alba, Transverse Section.

FIG. 80.



Lawsonia Alba. Upper Surface.

The *Senegal leaves* scarcely differed in structure from the others. They are 1 to 2 cm. longer.

The chemical investigation of the powder revealed the presence of wax, chlorophyll, a soft acrid resin, a hard resin, appearing under the microscope in turmeric-yellow scales, tannin, coloring matter, and a volatile alkaline substance, possibly trimethylamine. The small quantity of material did not, however, permit a nearer investigation of this easily decomposable body, which is evidently an amine base.—Phar. Jour. Trans., April 16th, 1881, pp. 855–857.

ROSACEÆ.

Rose Leaves—Artificial Coloration with Rosaniline and Detection.—Mr. T. Edward Greenish draws attention to the appearance in the English market of rose leaves which appeared to be artificially colored. On examination, they proved to be colored with rosaniline. The following process, which is mainly grounded on the fixing of the color by means of wool, is recommended by the author: A tincture of the petals in proof spirit is prepared of a strength of about 1 in 8. Two ounces of this tincture are made alkaline by ammonia, a few threads of fine white wool are added, and the whole is boiled until the spirit and ammonia are dissipated. The wool is taken out, washed, and heated gently in a test-tube with a small quantity of a 10 per cent. solution of caustic potash; the resulting brown solution is cooled, and diluted with half its volume of alcohol. A quantity of ether, equal in volume to the mixture, is added, and the whole well shaken. The ether, rising to the surface, is removed, and a few drops of acetic acid are added to it, when, in the presence of rosaniline, the pink color of its acetate is at once produced, and instantly discharged by the action of nascent hydrogen. Natural undyed rose petals treated by this process afford no such reactions. The process is adapted from the one originally applied to red wine.—Ber. d. Deutsch. Chem. Ges., 13, 2263; Phar. Jour. Trans., March 5th, 1881, p. 733.

Quince Seed.—Mr. C. Hobley reports having met with a quince seed, the appearance of which excited scarcely any suspicion, but which, on closer examination, was found to be adulterated with 25 per cent. of fragments of the pericarp of an undetermined fruit.

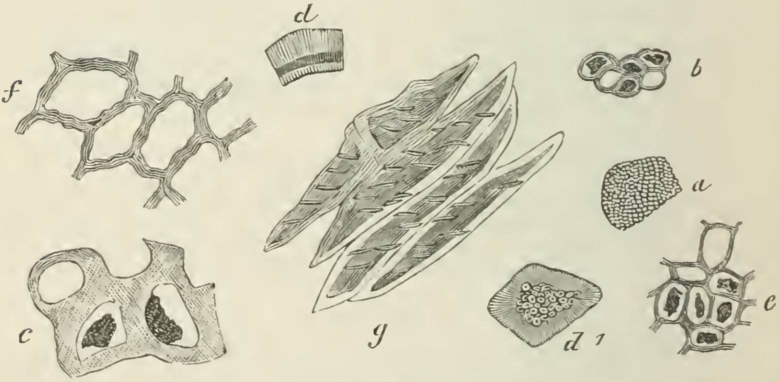
LEGUMINOSÆ.

Cassia Occidentalis, L.—*Analysis of the Seeds.*—Dr. J. Moeller has subjected the seeds of *Cassia occidentalis*, L., which are used in various parts of the world as a substitute for coffee, and known as

Mogdad-Coffee, "*Café chilen chile*" (Colombia); "*Zherbe puante,*" "*pied-poule,*" "*negro coffee*" (Martinique); "*Benta-maré*" (Senegal).—Considerable quantities are imported into England, Belgium, and Germany. Considerable quantities can be produced in the Senegal, and the plant abounds also in the Galon, and on Réunion. The seeds are easily toasted, and when mixed in quantities not exceeding 20 per cent. with ground coffee, such cannot easily be distinguished by taste or appearance from pure coffee. The seeds are egg-shaped, flattened on the sides, somewhat pointed, about 4.5 mm. long, the breadth and thickness varying between 2.9 and 3.6 mm. and 1.2 and 1.9 mm. Occasionally a globular seed is found. Their average weight is 16 mgram. Their color, when dry, resembles the pale grayish-yellow of some sorts of coffee. The surface is smooth. Subjected to analysis, the author obtained the following results: Cellulose, 21.21; fixed oil, 2.55; mucilage, 36.60; iron-greening tannic acid, 5.23; inorganic salts, 4 33; nitrogenous organic substances, 15.13; non-nitrogenous organic bodies, 3.86; water, 11.09: = 100. Caffeia is not contained in these seeds, which, owing to the large percentage of nitrogenous matter, must nevertheless possess considerable nutritive properties.—Pharm. Centralh., July 15th, 1880, p. 249; from Dingl. Jour., pp. 237, 61 and 84.

In a subsequent paper (Ibid. September 2d, 1880, p. 314) Dr. Moeller gives a microscopic description of roasted and ground "Mogdad coffee," mixed with genuine coffee. This may be of some importance, since its use as an adulterant of ground coffee is not at all unlikely. The author states that the odor given off during the roasting of Mogdad coffee is very like that given off by genuine coffee. Under the microscope the mixture of Arabian and Mogdad coffee presented the appearance shown in Fig. 81, *a* to *g*.

FIG. 81.



Arabian and Mogdad Coffee.

a. Cuticle with the impression of the palisade cells.

b. Cellular tissue of the epidermis with dark-brown contents.

c. Colenchymatous tissue. The contents of the cells are for the greater part coagulated; the swollen granular contents are only recognized here and there.

d. The palisade cells of the epidermis. The prismatic individual cells are expanded near their lower third, and containing a brown, granular substance, show a dark ring.

d'. A transverse section of the palisade cells, frequently quite indistinct, and made obscure by red-brown tissue beneath.

e. Fragment of the cellular tissue of the germ.

f. Albumen cells of the genuine coffee.

g. Cells of the inner epidermis of genuine coffee.—Phar. Centralh., September 2d, 1880, p. 314.

Acacia Gregii, etc.—Source of Shellac in Arizona.—At a recent meeting of the California Academy of Sciences, Professor Stillman read a paper on the gum and coloring matter found in the *Acacia Gregii* and the *Larrea Mexicana* or creasote plant. The gum which exudes from these plants is very abundant, and is the product known to commerce as shellac. The same plants produce lac dye. Professor Stillman suggested that California might compete with British India in supplying this valuable product. Mr. B. B. Redding said that these lac-yielding plants were as plentiful as sage-brush from Southern Utah to New Mexico, and from the Colorado Desert to Western Texas. The lac is most abundant around stations on the Mojava and Colorado deserts, and exudes as the result of an insect sting. To collect this is simple work for boys, and will prove an important industry. It will require little or no capital. The twigs are boiled in water and the gum rises to the top, is skimmed off, strained and dried on smooth stones and handpressed into flakes, ready to make sealing-wax or varnish. The residue, when allowed to settle, makes lac dye. The plants, a description of which (from vol. iv (Botany) of the "Reports of the United States Geographical Surveys" west of the one hundredth meridian) is given, live on a rainfall of three inches a year.—Am. Jour. Pharm., August, 1880, p. 409.

Acacia Pycnantha, Benth.—*Medicinal Uses of the Bark.*—Dr. S. J. Margery, in a paper read before the Adelaide Philos. Soc., draws attention to the medicinal uses of the bark of this tree, which is a native of Australia. The bark is there called

Wattle Bark.—In the form of infusion it is regarded as a valuable remedy in infantile diarrhœa; a drachm of the bark being infused in two-thirds of a breakfastcupful of boiling water and given in doses of a teaspoonful every half hour, two or three doses affording relief. It is also a favorite and successful country remedy in catarrhal ophthalmia. Two drachms of a tincture mixed with an ounce of glycerin is a useful application in discharge from the ears, for chapped lips, sore nipples, and slight fissures of various kinds. The bark also yields a good gargle for relaxed throat. The gum is used internally for piles, and in veterinary practice for wounds and raw shoulders.—New Rem., July, 1880, p. 211.

Gum Savakin—Composition.—This variety of gum, which is shipped from the port of Suakin or Savakin, whence its name, appears in commerce as semi-globular tears, which are more or less broken, have a conchoidal fracture, numerous fissures, and are quite opaque. It appears to be imported in considerable quantities. Mr. George Reiman has subjected it to examination, and finds that it will not dissolve in water, either hot or cold, simply swelling up in it. On the addition of caustic potassa, however, it dissolves completely, and forms a very good mucilage. It is chiefly composed of *gummic acid* in the free state. Incinerated it leaves 3.8 per cent. of ash, containing calcium, magnesium, and potassium.—Am. Jour. Phar., April, 1881, p. 155.

Gum Arabic—Comparative Examination.—E. Masing has subjected two varieties of gum arabic occurring in Indian commerce to comparative examination, and gives a description of the same. Eight of the samples are from the India Museum, London, and two from the collection of the Pharmaceutical Society of Great Britain. They have all been described by Dr. M. C. Crookes in his report on the gums, resins, oleo-resins, and resinous products of the India Museum as produced in India (London, 1874), and the author's special description needs therefore not to be repeated. The results of his experiments are shown in the following table:

Gum of	Per cent. Moisture.	Per cent. Solubility.	Per cent. Ash.	Quantity of 1-10 nHCl required by 1 gm. Ash for saturating, c.c.	Silicate of Potassium.	Stannate of Potassium.	Neutral Acet. Lead.	Basic Acet. Lead.	Neutral Acet. Copper.	Ferric Chloride.
1. Acacia catechu.	12.26	82.50	3.25	171	No precipitate.	Precipitate; insoluble in excess.	No precipitate.	Precipitate; insoluble in excess.	No precipitate.	No precipitate.
2. Acacia speciosa.	10.72	30.40	4.67	155	No precipitate; increased fluorescence.	Turbidity; not clearing with excess; fluorescence disappearing.	Turbidity; not clearing in excess.	Brown precipitate; insoluble in excess.	No precipitate; yellow-green coloration.	No precipitate; deep yellow-brown coloration.
3. Acacia leucophlœa.	13.58	53.54	3.87	170	Faint turbidity.	Precipitate; insoluble in excess.	Faint turbidity.	Precipitate; partially soluble in excess.	Turbidity.	No precipitate.
4. Albizzia stipulata.	13.01	16.92	3.54	158	No precipitate.	No precipitate.	No precipitate.	Faint turbidity.	No precipitate.	No precipitate.
5. Azadirachta indica.	12.89	31.16	4.33	146	Faint turbidity.	Precipitate; partially soluble in excess.	Turbidity; becoming clear in excess.	Precipitate; insoluble in excess.	Faint turbidity.	Turbidity.
6. Odina wodier.	13.89	60.96	3.35	184	No precipitate.	Precipitate; insoluble in excess.	Faint turbidity.	Precipitate; insoluble in excess.	No precipitate.	No precipitate.
7. Conocarpus latifolius.	12.81	86.08	2.20	190	No precipitate.	Precipitate; insoluble in excess.	No precipitate.	Turbidity; not becoming clear in excess.	No precipitate.	No precipitate.
8. Anogeissus latifolius.	14.03	11.58	5.32	211	Faint turbidity.	Precipitate; insoluble in excess.	No precipitate.	Precipitate; insoluble in excess.	No precipitate.	No precipitate.
9. Feronia elephantum.	14.38	62.49	5.87	169	Turbidity.	Precipitate; insoluble in excess.	Precipitate; insoluble in excess.	Precipitate; insoluble in excess.	Precip. partially soluble in excess.	Faint turbidity.
10. Moringa pterygosperma	11.79	18.76	3.98	125	No precipitate.	Turbidity; not becoming clear in excess.	Faint turbidity.	Precipitate; insoluble in excess.	No precipitate; greenish coloration.	No precipitate; greenish-brown coloration.

Archiv. d. Pharm., July, 1880, pp. 34–41.

Gum Tragacanth—Comparative Examination.—Mr. Masing has also subjected twenty-four commercial varieties and substitutes of gum tragacanth to comparative examination. A portion of them are from Martiny's collection of drugs in the Dorpat Pharmaceutical Institute, and correspond to the description in Martiny's "Encyclopædia." Some of them were furnished by Mr. Holmes (from the Museum of the Pharmaceutical Society of Great Britain, one from the India Museum, London, and three from the St. Petersburg Pharmaceutical Trade Society). Most of them have evidently been described, and this abstract is therefore confined to the author's results, which are given in the following table:

	COMMERCIAL SORT.	Moisture. Per cent.	Ash. Per cent.	Quantity of 1-10 nHCl required to saturate 1 gram Ash = c.c	Solubility. Per cent.	Precipitate. cc.
1	Trag., Smyrna, ...	12.11	3.34	174	23 08	30
2	" " natur., ...	10.91	1.84	223	19.04	42
3	" via London (*a*), ...	10.90	2.30	216	24.93	61
	" " " (*b*), ...	11.37	2.63	223	42.46	63
4	" from A. Holstein, Constantinople, ...	11.94	3.59	163	41.60	100
5	" electa, ...	12.05	3.05	227	25.84	53
6	" in sortis, ...	11.64	4.48	146	14.20	31
7	" Morea vermic. electa, . .	12.66	3.15	193	19.00	32
8	" Morea vermic. in sortis, .	11.19	2.76	200	22.52	20
9	" Morea ordin., ...	11.31	2.78	180	28.92	33
10	" vermic. alba., ...	16.49	3.77	211	24.46	82
11	Traganton, ...	13.09	2.58	205	16.94	21
12	Trag., Syria, ...	9.68	2.83	196	25.04	17
13	" "	10.77	2.41	172	18.12	16
14	G. Kutera, ...	16.94	6.64	226	4.06	15
15	" " Caucasus, ...	12.37	2.49	202	26.72	40
16	" Bassora, ...	10.93	2.44	195	15.89	12
17	" " (Giessen), ...	11.47	2.19	168	21.84	15
18	Trag., Persian, ...	10.58	3.21	174	19.54	20
19	" " (v. Ossen), . .	10.84	1.83	217	23.46	21
20	" "	11.06	1.74	223	27.60	23
21	G. of Sterculia villosa, ...	17.22	8.17	202	18.41	58
22	" " " guttata, ...	16.74	7.30	194	13.96	37
23	" " " urens, ...	5.84	5.51	171	2.88	5
24	" " Uvaria tomentosa, . . .	16.62	6.54	213	7.60	55

The "precipitate" (so called) was determined by triturating 0.5 gram with a little water, setting aside for about one hour, then gradually mixed with water to furnish 100 cc. of homogeneous mucilage, which was then transferred to a narrow cylinder bearing cc. divisions. This was securely closed and allowed to stand for two days. Two layers, an upper clear and a lower turbid and compact one, had usually formed. The number of cc. occupied by the latter is indicated under the head of "precipitate" in the above table. The same liquid was then used to determine the "*solubility*" of the gum, the clear filtrate being evaporated and dried at 110° C.—Arch. d. Phar., July, 1880, pp. 41–48.

Balsam of Peru—Tests of Purity.—Professor F. A. Flückiger, as a result of comprehensive experiments and study, finds that the testing of balsam of Peru may be confined to the following points:

1. The specific gravity at 15° C. must be between 1.140 and 1.145. More extended experience will be required in order to decide whether it is more correct to accept the boundary figures at 1.138 and 1.147. The older statements of the specific gravity, as 1.15 and 1.16, are too high; it is a question whether the balsam which, in former times, was met with in commerce was perhaps heavier.

2. Ten drops of balsam produce with .4 gram of slaked lime a mixture which remains soft, and does not harden. But this test is not effectual when castor oil (or other fatty oil) is present. On warming such a mixture of lime, however, the fatty odor is plainly perceptible; if not, a very small amount of fat is added, and, upon ignition, decomposition products of the castor oil are formed, which possess a very peculiar odor.

3. When shaken with three times its weight of bisulphide of carbon, the balsam is separated into a dark-brown resin, which attaches itself firmly to the glass, and cinnamein, which imparts but little odor to the bisulphide of carbon.—Am. Jour. Phar., June, 1881, pp. 296–302; from Phar. Ztg., 1881, pp. 30, 222.

Myroxylon Peruiferum, Linn. Fil.—In a former abstract of Dr. Peckolt's paper (see Proceedings, 1879, pp. 241–245), the habitat and botanical characters of the plant, together with a description of the chemical character of the leaves, pods, and bark, were given. The following, which has appeared since then, completes the paper:

Wood.—The sawdust obtained from cutting up the timber of this useful tree is thrown away to the extent of millions of kilograms, and could better be turned to account for technical purposes than the wood itself. It has a brownish color, and, when fresh, a strong odor like that of a mixture of balsam of Peru and turpentine. It burns easily, with a clear, but sooty flame, giving off a pleasant odor, and leaving a white ash. As the result of several analyses, it was found to yield as the principal constituents in 1000 grams: 4.4 ethereal oil, 4.4 crystallized myroxylin, 5.1 balsam, 9.5 of an odorless soft resin, 31.4 of an acid resin, and 0.09 gram. of benzoic acid, besides traces of gallic and tannic acid, and coloring, extractive, and inorganic matter, etc.

The *ethereal oil* is of a pale-yellow color, or, after repeated distillation, entirely colorless. It has a pleasant aromatic sassafras-like odor, and a burning aromatic taste, and is neutral to test-paper. When treated with sulphuric acid and bichromate of potassium, it yields on distillation, besides a few drops of oil, a distillate containing butyric and valerianic acids. When submitted to the action of a mixture of nitric and sulphuric acids, it gives off a penetrating odor, and 1 gram of oil affords 0.6 gram of a brittle resin, with a musky odor, which it retains for a long time when exposed to the air; this resin might probably be used for sachet powders, pastilles, etc.

The *acid resin* obtained from the wood was found on examination to be a complex body, consisting of five acid resins, a neutral resin, and a small quantity of myroxylin.

Myroxylin is obtained in the largest quantity from the bark, but may also be obtained from the sawdust of the wood, by exhausting it with bisulphide of carbon, evaporating by distillation, and separating the resinous oil which adheres to the conglomerated mass of crystals left in the retort, and purifying them by solution in boiling alcohol and recrystallization. The process of preparation and the purification of the crystals from the bark is very troublesome. The acicular crystals are odorless and colorless, readily soluble in chloroform and bisulphide of carbon, less in ether and boiling alcohol of 80 per cent., and with difficulty in cold alcohol, and insoluble in cold or boiling water. It is a neutral substance, uniting neither with acids nor bases, and does not appear to be a glucoside. It would seem to be a chemically indifferent crystalline resin, and resembles in many points the *myroxocarpin* of Stenhouse. When compared with the true balsam of Peru, the balsam of *M. Peruiferum* exhibits the following differences:

M. PEREIRÆ.	M. PERUIFERUM.
Specific gravity 1.160.	Specific gravity 0.955.
Taste warming to the tongue; then burning the throat; bitter and aromatic; odor agreeable, like vanilla.	Taste slightly pungent, but not warming; aromatic and astringent; odor aromatic.
Yields a volatile oil when distilled with water	Gives only traces of a volatile oil.
Mixes with chloroform in all proportions.	Acts in the same manner, but deposits a powdery precipitate on standing.
Dissolves in six parts of alcohol of 90 per cent , and gives after a time a fawn-colored precipitate.	Soluble in alcohol of 90 per cent. in all proportions, and forms no deposit.
Ether, benzin, and petroleum spirit dissolve only the yellow oil (cinnamein).	Insoluble in these three liquids.
Bisulphide of carbon only partially dissolves it, giving a yellow solution.	Bisulphide of carbon partially dissolves it, forming a clear light-brown solution.
Castor oil takes up 15 per cent.	Mixes with castor oil in all proportions.

M. PEREIRÆ.	M. PERUIFERUM.
Equal volumes of balsam and concentrated sulphuric acid mixed give a stiff mixture, which, kneaded under water, yields a little resin, which is not sticky when pressed between the fingers.	The same treatment causes the formation in twelve hours of a gelatinous mass, of a reddish-black color, which, kneaded under water, colors it dirty green; the mass, after washing, is sticky, and of a greasy consistence.

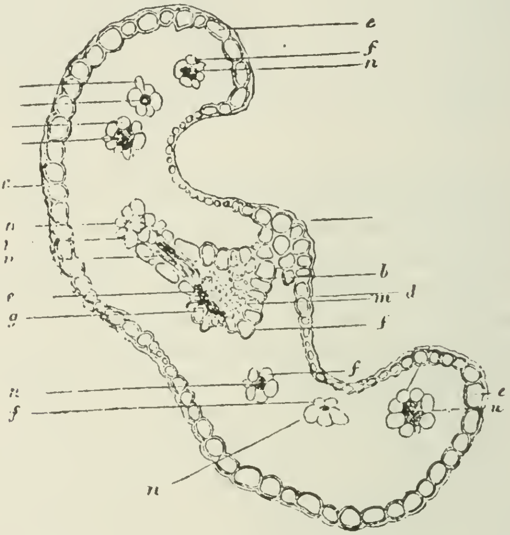
In many points the balsam from the wood of *M. peruiferum* agrees with the balsam of Peru, and Dr. Peckoldt thinks it could for many medicinal purposes replace that more expensive drug, and might be distinguished in commerce as *Brazilian balsam.* He states that he has used it with remarkable success as a balsam for wounds and in the treatment of scabies. — Phar. Jour. Trans., April 2d, 1881; from Zeitschr. Œst. Apoth. Ver., 1879, pp. 49, 145, 426, 441, 457; 1880, p. 130.

Cape Tea—Source and Microscopical and Chemical Examination.—Mr. Henry G. Greenish has subjected two specimens of Cape tea,—called respectively "Honig-thee" and "Bush Tea," and used in the Cape of Good Hope as a substitute for tea,—to microscopical and chemical examination. The first of these is said to be derived from *Cyclopia genistoides;* but Professor Alexander Bung, to whom Mr. Greenish had submitted the specimens, together with known samples of *C. genistoides*, etc., expressed the opinion that neither the one nor the other could be referred to the latter species, but that the drug called "Honig-thee" was probably derived from *C. longifolia* or *C. galeoides*, while "Bush Tea" is possibly derived from *C. brachypoda.* This view is supported in Rosenthal's "Synopsis Plantarum Diaphoriacum," in which the three last-named species are mentioned as yielding Bush tea. Mr. Greenish's description is as follows:

I. *Cyclopia Longifolia? Galeoides?—Honig-thee.*—The drug consists of stalks and leaves, bound together in bundles, weighing about 300 grams each, and measuring in length about 45 centimeters. The stalks were of a yellowish-brown color, varying in diameter from 1 to 4 and 5 mm., bearing the leaves arranged spirally in groups of three. The latter are linear lanceolate, from 10 to 26 mm. long, about 2 mm. broad, and $\frac{2}{3}$ mm. thick. The consistence is somewhat leathery, at the same time brittle; margins entire, rolled inward so as almost to conceal the midrib; color dark green. A few reddish-brown papilionaceous flowers about 12 mm. long, and 9 mm. broad, with a deep-toothed calyx, were also found in the drug. The odor, though not strong, was pleasantly aromatic; taste slightly bitter and astringent, not at all disagreeable.

Under the microscope, the transverse section of the *leaf* (Fig. 82) shows a prominent epidermis (*e*), consisting on the upper side of a single layer of large parenchymatous cells surmounted by a largely developed cuticle (*c*). On the under side of the leaf these epidermal cells are much smaller, and the cuticle much less developed, except at the point just opposite to the midrib (*m*), where they appear about the same size as those of the upper surface. Next to the epidermis is situated the parenchymatous tissue (omitted in the woodcut for the sake of greater clearness), consisting of rounded cells containing chlorophyll; *n*, *n*, *n*, are side nerves; *n'*, side nerve branching from midrib; *b*, bast fibres; *d*, cambium layer; *g*, vascular tissue; *f*, cells containing red coloring matter.

FIG. 82.

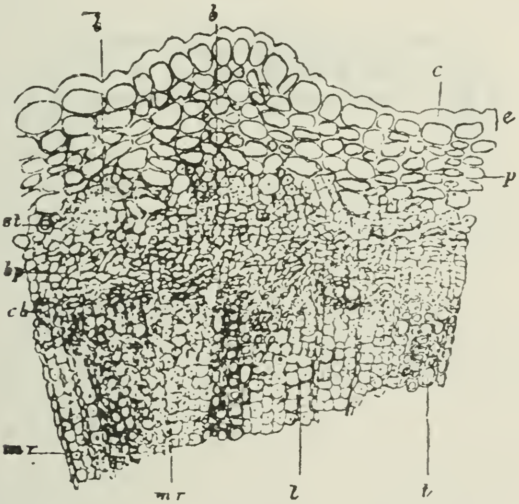


CYCLOPIA LONGIFOLIA (?) GALEOIDES (?).—Transverse section of leaf: *e*, epidermis; *c*, cuticle; *m*, midrib; *n*, *n*, *n*, side nerves; *n'*, side nerve branching from midrib; *b*, bast fibres; *d*, cambium layer; *e*, woody tissue; *g*, vascular tissue; *f*, cells containing red coloring matter (here removed by washing with water). For the sake of greater clearness the parenchymatous tissue of the leaf has been omitted in the wood-cut.

The *midrib* is composed of a central portion of more or less thickened wood cells, arranged in layers alternating with layers of thin-walled cells (*e*) (parenchyma of the wood), and bounded on the upper side (*i. e.*, on the side directed towards the upper surface of the leaf) by spiral and annular vessels (*f*), on the under side by several rows of thin-walled parenchymatous cells (bark parenchyma). This bark parenchyma (*d*) contains probably sieve cells. Following these parenchymatous cells is a layer of more or less thickened bast fibres (*b*). Each nerve is surrounded by a single layer of large cells (*a*) filled with red coloring matter. This latter is soluble in water, and if the section be warmed with dilute sulphuric acid it assumes a deep purple tint.

The *stalk*, in transverse section (Fig. 83), showed similarly an epidermis (*e*) with a largely developed yellow cuticle (*c*). Next to the epidermis are several layers of rounded parenchymatous cells (*p*) containing a granular, partly colorless (? protoplasm), partly red substance. Within the parenchymatous layer are situated groups of bast fibres (*b*), forming together a tolerably continuous ring, accompanied here and there by stone-cells (*st*), singly, or in groups of two or three. These stone-cells are thick-walled, and, as seen on the longitudinal section, of irregular shape. Between the bast fibres and the cambium ring (*cb*) is a layer of small, irregular, thin-walled parenchymatous cells traversed by the medullary rays (*m r*). In this layer occur groups of very small elements, apparently produced by the division longitudinally of one of the parenchymatous cells. The examination of the longitudinal section showed the presence of numerous sieve-cells. The wood consists of the libriform wood-cells (*l*) interspersed with irregular groups of tracheids (*t*), both spiral and with ringed pores. It is traversed by medullary rays formed of a single row of somewhat thick-walled porous cells, possessing an unusual vertical length. The pith is made up of large rounded parenchyma. In addition to the frequent occurrence of starch-grains in the bast parenchyma (*b p*), medullary rays, and pith, and the red granular substance

FIG. 83.



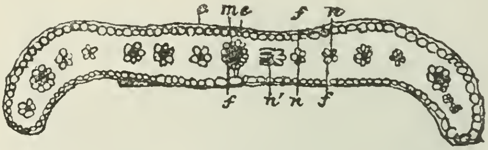
Transverse section of stalk of *C. longifolia* (?) *galeoides* (?): *c*, cuticle; *e*, epidermis; *p*, parenchyma; *b*, bast fibres; *bp*, bast parenchyma (and sieve-cells); *cb*, cambium layer; *st*, stone-cell; *mr*, medullary rays; *l*, libriform wood-cells; *t*, tracheiden.

in the bast parenchyma, the presence of well-formed sphæro-crystals may be noticed, especially in the cells of the medullary rays.

II. *Cyclopia Brachypoda* (?)—*Bush Tea.*—The sample consisted of leaves with a few flowers. The majority of the former were from 10–15 mm. long, 2–3 mm. broad, margins entire, rolled inwards, but not so much so as in sample I. The leaf presents a broader and shorter appearance. The flowers are yellowish, about 13 mm. in length, 4 in breadth, calyx toothed, but the teeth about half the length of those of the foregoing sample.

The transverse section of the leaf (Fig. 84) is much longer and narrower than that of the preceding species. The microscopic characters are similar, but the cells containing the red coloring matter (*f*) are neither so large nor so prominent. The parenchymatous tissue (also omitted in this instance for the sake of greater clearness) consists for the most part of somewhat narrow cylindrical cells, arranged parallel to one another and at right angles to the surface of the leaf. In the cut, (*c*) shows the cuticle; (*e*), the epidermis; (*m*), the midrib; (*n*, *n*), the nerves; (*n'*), the side nerves just branching from the midrib; and (*f*), the cells containing coloring matter.

FIG. 84.



CYCLOPIA BRACHYPODA (?).—Transverse section of leaf: *e*, epidermis; *c*, cuticle; *m*, midrib; *n*, *n*, side nerves; *n'*, side nerves just branching from midrib; *f*, cells containing coloring matter (removed by washing with water). The parenchymatous tissue omitted for the sake of greater clearness.

The author subjected the first variety of Cape tea (Honig-thee, *C. longifolia* (?)) to chemical examination. Manipulating by Dragendorff's method for the determination of theine, he proved the absence of an alkaloid. He has, on the other hand, determined with certainty the presence of:

(1.) A glucoidal substance similar to cinchono-novatannic acid, and undergoing when boiled with dilute mineral acid a similar decomposition, yielding a substance bearing a close resemblance to cinchono-nova-red. This glucoside he has named *cyclopin*.

(2.) A crystalline substance which in alkaline solutions possesses a green fluorescence (named by the author *cyclopiofluorescine*).

(3.) A third substance analogous to *cyclopin* (probably an oxidation product) and undergoing similar decomposition.

The author's experiments also show that Cape tea is very deficient in nitrogen, compared with tea from *Thea;* that very small quantities of that nitrogen pass into aqueous solution, and that it must therefore be entirely destitute of any nourishing property. On the other hand, the total substance dissolved by water from Cape tea (30.4 per cent.), is in very close agreement with the total dissolved by water from tea from Thea (30–33 per cent.).—Phar. Jour. Trans., January 8th and 15th, 1881, pp. 549 and 569.

Professor A. H. Church draws attention to the fact that he had previously ("Chem. News," July 1st, 1870, p. 2) drawn attention to a fluorescent body obtained from *Cyclopia Vogelii,* which he had determined to be an acid, and named

Cyclopic Acid.—In composition it corresponds to the formula $C_7H_8O_4$. —Ibid. February 19th, 1881, p. 693.

Copaiba—Detection of Resin.—Dr. C. Grote has found that copaiba resin, when shaken with petroleum ether, forms a turbid liquid, which soon becomes clear, the substance causing the turbidity depositing and adhering tenaciously to the sides of the vessel. If the copaiba, however, contains colophonium in appreciable proportion, the resin, obtained by evaporating off the oil, will also form a turbid fluid, but the substance causing the turbidity will no longer adhere to the sides of the vessel, and may, even after standing for days and weeks, be readily shaken off. The conditions necessary are that the copaiba be exposed until the residual resin can be kneaded between the fingers without adhering, and that more than 5 per cent. of colophonium shall be present. With 5 per cent. the results are not certain, while with 10 per cent. the deposit occasionally adheres after standing for some time; but when the percentage is higher, the result is invariably as above stated. The author expresses the hope that others may experiment in this direction, and believes it possible to develop a practical method.—Phar. Centralh., February 24th, 1881, p. 87.

Piscidia Erythrina, Linn.—*Characters and Physiological Properties.* —A. C. Nagle describes some physiological experiments made with the resinoid constituent of the "Jamaica dogwood" bark, which lead him to the following summary of its physiological action:

1. It is a narcotic to higher as well as lower animals. 2. It dilates the pupil. 3. It causes an increase of the respiration, followed by a sudden decrease. 4. Produces salivation and profound diaphoresis. 5. Reduces the action of the heart, and has little effect upon the temperature, producing general paralysis and death by asphyxia.

The bark of the root is the part used in medicine. It is found in the market in quills and flat pieces. The former are often from one-half to one inch in diameter, and generally destitute of the suberous tissue; while the latter are from one to two inches in diameter, slightly curved, and about a quarter of an inch or less in thickness. The bark between the inner and outer surface is of a greenish resinous hue, and breaks transversely with a short fibrous fracture. Its medicinal virtues are extracted by alcohol, it owing its activity to the resinoid "Piscidin," which is obtained as an amorphous yellow powder.—Drug. Circ., February, 1881, p. 18.

Red Clover Blossoms—Reputed Value as a Remedy for Cancer.—A writer in "Medical News" gives his experience with clover tea as a remedy for cancer, according to which it appears to be valuable as such. The tea should be made from the red clover blossoms as tea is made for table use, strained, and taken before meals and at bedtime—about a quart daily. A fluid extract has been made, of which the dose is a tablespoonful thrice daily.—Am. Jour. Phar., February, 1881, p. 85; from Virg. Med. Monthly.

TEREBINTHACEÆ.

Anacardium Occidentale—Poisonous Character.—Mr. Henry Fisher, while engaged in making an acetic extract of *Anacardium occidentale* (cashew nut), was exposed to the vapors arising during the concentration of the liquid extract. As a result, his face and neck became painfully inflamed and swollen, and though various applications were made, such as alkaline solutions, cold water, solution of acetate of lead, etc., no relief was experienced until the entire surface had been painted with tincture of iodine.

Professor Maisch observes, in this connection, that the juice of the pericarp of the cashew nut is known to produce a very painful and persistent eczematous eruption, which is due to *cardol;* and though the latter is not volatilized without decomposition, yet the vapor arising during the roasting of the cashew nut is apt to cause severe and painful inflammation and eruption unless great caution is used. This would seem to indicate that by the aid of other vapors cardol is partly volatilized.—Am. Jour. Phar., June, 1881, p. 282.

Chian Turpentine—Collection and Supply in Chios.—Dr. Stiepowich, a resident of Chios, communicates some additional facts relative to the collection and supply of turpentine from *Pistacia terebinthus*, L. The turpentine tree has existed in the island for many years, and attains great size, the circumference of the trunk being often four to five meters, and the height fifteen to twenty. The author calculates that there are some 1500 trees on the island, which are capable of yielding about 2000 kilos of turpentine, mixed with at least 30 per cent. of foreign matter. There are no appliances for refining the product here, except the sieves through which it is passed to remove the pebbles and bits of wood which are found in it.

It is gathered from incisions made in the tree in June. Axes are used for this purpose, and the incision must be through the whole thickness of the bark. Through these outlets the turpentine falls to the foot of the tree, and mixes with the earth there. On its first appearance the turpentine is of a syrupy consistence, and is quite transparent; gradually it becomes more opaque, and of a yellowish-white color. It is at this period also that it gives off its characteristic odor most abundantly.

It is, however, not the product "turpentine" that is most esteemed by the natives, but the fruit of the tree, a kind of drupe disposed in clusters. The fruit is improved by the incisions made in the tree for the escape of the turpentine, otherwise the resin, having no other outlet, would impregnate the former, hinder its complete development, and render it useless for the purposes for which it is cultivated. One circumstance worth noting is that, as soon as the fruit commences to ripen, the flow of turpentine completely ceases. This is towards August; the fruit is then green; it is gathered, dried in the sun, bruised, and a fine yellowish-green oil is drawn from it, which is soluble in ether. This oil is used for alimentary purposes, but rarely for illumination since the introduction of petroleum. It is mostly used in making sweet cakes, and often as a substitute for butter, in all cases where the latter is employed.

This year the Chians have been surprised by an extensive demand for this product, from London in the first place, and secondly from Vienna, and the proprietors, although but poorly provided at the moment, sent away nearly 600 kilos. Paris has not yet made any demand.—New Rem., April, 1881, p. 104.

Chian Turpentine.—Professor Landerer has examined numerous Pistacia plants (*Pistacia terebinthus*), and concludes that a supply of Chian turpentine could be collected in various parts of Greece. By pressing the fresh resinous berries between hot plates, a kind of turpentine is obtained, which probably has the same medicinal properties as that derived from the stem —New Rem., February, 1881, p. 45.

Chian Turpentine—New Source of Supply.—Professor Flückiger is of the opinion that it is not at all probable that a good and regular supply of Chian turpentine can be obtained from Chio. The island has never produced it largely; but *Pistacia terebinthus*, being distributed over a very wide area, could well be laid under contribution from other countries. The best plan would, perhaps, be to go to Algeria, where, in the forests, this terebinth may be found very frequently, either mixed with oaks and lentisks, or in clumps and groves. The trees grow to a height of fifty feet, and to a circumference of more than six feet, and attain great age. It may fairly be presumed that the Algerian resin is identical with that collected in the island of

Chio, and, by systematically puncturing the bark, the yield, which at present is from seven to fourteen ounces annually per tree, might be largely increased. There is thus a possibility of procuring any quantity of Chian turpentine at a moderate rate.—New Rem., December, 1880, p. 363; from Phar. Jour.

Chian Turpentine.—Mr. Edward S. Kelly, in his experience, has found much of the Chian turpentine of the New York market to be spurious. The peculiar odor serves to distinguish the true Chian turpentine from all others. This mastic-like odor is well defined in a lot just received from Scio direct, being this year's collection. It is brittle, brown, and very dirty, yielding no less than 24 per cent. of impurities (sand and bark). A sample of the Chian turpentine, originally employed by Dr. Clay, was solid, breaking with a shining fracture, of an agreeable odor, easily made into pills with the fingers, of a brown color, owing to the presence of impurities. The spurious article, most commonly found in the market, answers the description of larch turpentine, and comes from the island of Scio. It is a fluid of a greenish-yellow tinge, piny odor, pleasant taste when first tasted, but soon develops an acrid sensation in the back of the mouth, lasting for some time.—New Rem., December, 1880, p. 362.

Chian Turpentine—Description.—Mr. A. Janssen describes Chian turpentine which had been collected for him by a Grecian physician on the island of Chios from Pistacia terebinthus. This authentic specimen has a very different appearance from that obtained from England. It had the consistence of thick liquid storax, brittle, and but slightly sticky when handled. By transmitted light it is not transparent, but appears tolerably so when thin layers are held towards the light, and would then appear quite transparent were it not for the many dispersed black spots arising from small inclosed particles of the bark of the tree. The color, as observed in a mass, is brown, with a green tint, and in some pieces appears brownish-yellow. The odor is neither that of turpentine nor of fennel, as stated by some, but has much similarity to the odor developed when colophony and yellow wax are melted together; a peculiar aromatic odor must be admitted, which has some resemblance to that of lemon. The taste is exceedingly mild, neither bitter nor acid A solution in rectified spirit is not clear, giving upon standing an insignificant precipitate, and feebly reddens litmus; in ether, acetone, and amylic alcohol, it dissolves to form a nearly clear liquid.

For *internal* use it is best prescribed in the form of pills, and the following formula is recommended by the author:

℞. Terebinth. Chia, ... 4.0 grams.
Sulphur. depurat., ... 1.5 grams.
Pulv. rad. glycyrrh., q. s. ut ft. pilul. No. 30.
Signa. Two pills every four hours.

For *external* use it is best employed as ointment with vaselin (5.0 grams of the turpentine to 30.0 grams of vaselin). This is best mixed with gentle heat.—Am. Jour. Phar., December, 1880, p. 604; from Phar. Ztg., October 23d, 1880.

Chian Turpentine—Therapeutic Value.—Professor John Clay draws attention to the fact that most of the Chian turpentine offered in the markets is fictitious. Of upwards of three hundred samples which have been sent to him for identification, and which had been sold under guarantee of purity, only a few were genuine. His experience with the genuine article, since first writing upon the subject, substantiates his original conclusions as to its efficacy in cancer. The turpentine has, in his opinion, not had a fair trial, and cannot have a fair trial until the genuine article is more readily and abundantly obtainable in the market. Much also depends upon the manner of its exhibition. The mucilage with which the emulsion is made should be fresh, and the emulsion as perfect as possible. The addition of sulphur is an advantage, and should be omitted only when it is not tolerated by the patient.—Phar. Jour. Trans., October 16th, 1880, p. 309; from Lancet, October 2d, 1880.

Rhus—Various Species, their Uses, etc.—Dr. T. J. W. Burgess, at the recent meeting of the Canada Medical Association at Ottawa, read a paper on the beneficial and toxical effects of the various species of *Rhus*, from which the following abstract may find place here:

No less than fourteen species of *Rhus* are, or have been, used in the arts and sciences (the term including medicine), and these may be divided into two classes, native and foreign. Of the foreign species there are six, viz.:

Rhus cotinus, sometimes cultivated in our gardens, and known under the name of "smoke plant." It is a native of Siberia, Austria, and Northern Italy, and finds no application in medicine or pharmacy, but yields one variety of the yellow dye-wood, known in the trade as *fustic.*

Rhus coriaria, a native of the Ukraine, in Russia. Both the leaves and berries have been used as astringents and tonics, the ground twigs as a dye-stuff.

Rhus succedanea, indigenous to Japan, yields the vegetable wax known as "Japanese Wax."

Rhus vernicifera, a native of India and Japan, and yielding, from incisions in the stem, a gum from which is made one of the best varnishes.

Rhus metopium, found in the West Indies, chiefly Jamaica, is said to be one of the sources of "hog gum," so extensively used by bookbinders in the process of marbling paper.

Rhus semialata, a native of China and Japan, yields a gall largely used by the Chinese in dyeing their celebrated yellow silks. It is also highly esteemed by them as an astringent medicine.

Of the native species of *Rhus* there are eight, four of which are non-poisonous, and four of them highly noxious. By non-poisonous, however, is only understood that the plants are not poisonous by contact, for even these may act as irritants in large doses. The non-poisonous are:

Rhus aromatica,—fragrant sumach,—which extends from Lake Superior westward and southward, in dry rocky soil, a variety, the *R. trilobata*, of Nuttall, chiefly affecting the Rocky Mountains and Sierra Nevada. This plant has, during the past ten years, whether justly or not, obtained a high reputation as an astringent, and seems to deserve an extended trial. The dose of the fluid extract, in cases of hæmorrhage, is 20 drops every hour in extreme cases; for diarrhœa, 15 drops after each stool; for nightsweats, 10 to 20 drops at bedtime.

Rhus glabra is well known, and is an officinal of the U. S. Pharmacopœia (*i. e.*, the fruit, Rep.). The fluid extract of the inner bark is useful for many purposes, and in the treatment of mercurial ptyalism is better adapted than preparations of the fruit.

Rhus copallina, which is mentioned as one of the plants yielding gum copal, possesses similar, but less strongly marked, medicinal properties to *R. glabra*, for which it may be substituted.

Rhus typhina—staghorn sumach—is very common throughout Canada. It also possesses properties similar to *R. glabra*.

The poisonous characters of the four remaining species are very similar. They are:

Rhus pumila, growing only in the Southern States, and very common in North Carolina.

Rhus diversiloba. Torr. et Gray (*Rhus lobata*, Hook.), approaches very nearly to *R. Toxicodendron*. It is chiefly known by the Spanish name of "Hiedra." According to Dr. Caultfield, an antidote to poisoning by this species is found in another California plant, the *Grindelia hirsutula*, of which either the bruised plant itself or a decoction is applied to the parts.

Rhus venenata, formerly called *Rhus vernix*, is known by the different names of poison dogwood, poison elder, poison ash, poison sumach, swamp sumach, white sumach, and varnish tree. Like *R. Toxicodendron*, it is found throughout North America, and it affects rich, swampy ground in shady situations. The poisonous properties of this plant, which is one of the handsomest shrubs imaginable, are said to be even more powerful than those of the last species.

Rhus Toxicodendron, which may be made to include *R. radicans*, as botanists are now well agreed that it is merely a variety of the former.

The plants for which these are most frequently mistaken are the Virginia creeper or American ivy (*Ampelopsis quinquefolia*), and *Aralia nudicaulis* and *A. quinquefolia*, commonly known as wild sarsaparilla and ginseng. The plants are easily distinguished if one will remember a single simple distinctive mark, viz., five leaflets on a single stalk, whereas *Rhus Toxicodendron* has only three. Other distinguishing marks are, that the *Aralias* have regular serrate leaves, and in *A. nudicaulis* the flower-stem is separate from the leaf-bearing one.—Phar. Jour. Trans., April 16th, 1881, pp. 858–860.

Rhus—Occurrence of Crystals.—Arthur Meyer has subjected the intercellular secretions of various species of *Rhus* to microscopic and microchemical examination, which has led him to some interesting observations. He finds that these secretions contain crystals in tolerable abundance, which, while differing in form according to species, possess the following reactions in common: The crystals are completely combustible; they dissolve without turbidity in sulphuric, acetic, and oxalic acid, and in lime-water, but are insoluble in alcohol, chloroform, and water; they are, moreover, double-refractive, and their lines of deflection are parallel and perpendicular to their edges. In three species—*R. Toxicodendron*, Mich., *R. vernicifera*, D. C., and *R. succedanea*, L. (perhaps also *R. venenata*, D. C.), all of which are closely related—the crystals were of identical shape, while the microchemical examination of the secretions also revealed no distinctive character. The crystals as well as the secretion of *R. pubescens*, Thunb., and *R. villosa*, L., were identical in character and differed from the above, while the form of crystals in the secretion of *R. cotinus*, L., was different from both of the above. Finally, *R. typhina*, L., is characterized by the absence of crystals and the peculiarity of the secretion, which appears as a fine granular emulsion.—Arch. d. Pharm., August, 1880, pp. 112–115.

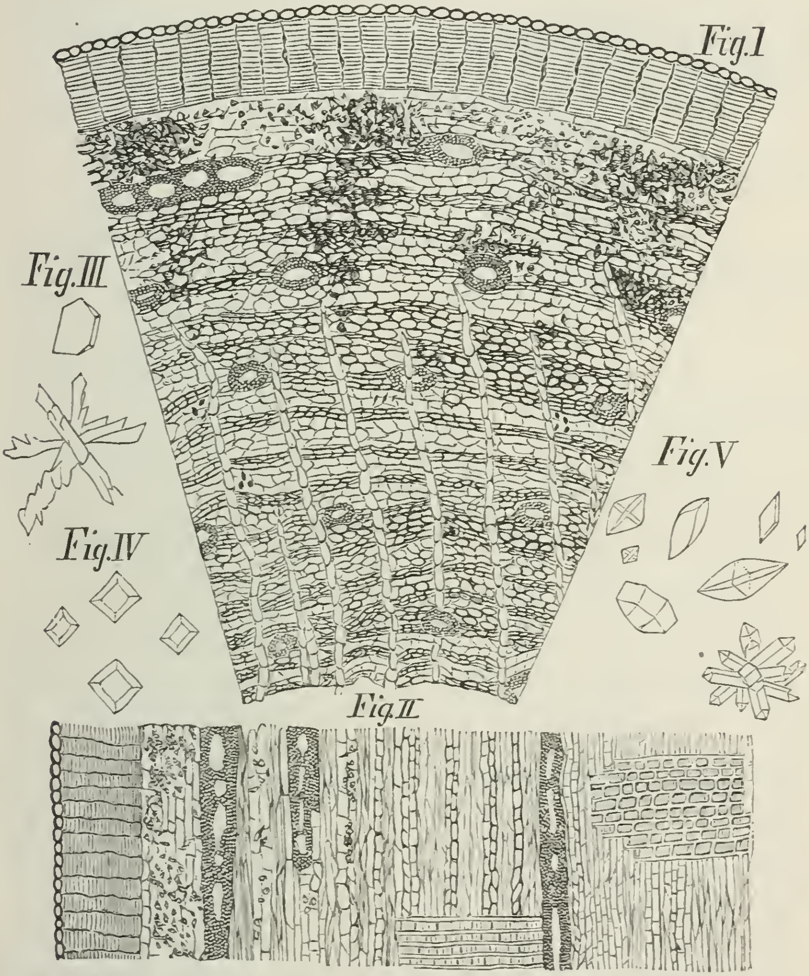
Rhus Aromatica—Microscopical and Chemical Examination.—Mr. Harry Winston Harper has subjected the bark of the fragrant sumach (syn. sweet sumach, stink or skunk bark) to microscopical and chemical examination. The bark occurs in quills, 1 to 4 inches in length, $\frac{1}{16}$ to $\frac{1}{2}$ inch in diameter, and $\frac{1}{20}$ to $\frac{1}{12}$ inch thick. The outer surface varies in color from light to dark brown, and is marked with corky protuberances and transverse fissures. When the corky layer is removed the outer bark is brought to view, which is of an orange-red color, is longitudinally wrinkled, and transversely fissured. The inner surface is whitish or flesh-colored, and striate. The bark is brittle, breaks with a somewhat granular fracture, yields an ochre-colored powder, and has a distinct, rather pleasant odor, more marked when green than when dry; its taste is astringent, aromatic, and slightly bitter when fresh, with a flavor peculiar to the plant from which it is derived. It should be collected in the spring of the year. Upon microscopical examination the bark appears to be radially and tangentially striate, and is marked throughout with oil-tubes and crystals, as is shown in the accompanying illustrations (Fig. 86). I shows a transverse section of the bark magnified to about forty or fifty diameters. The epidermis consists of a single row of cells, the walls of which are of a dark-brown color. The corky layer is somewhat lighter brown, and the cells number, radially, from sixteen to twenty-five; mostly, however, eighteen. The first layer beneath the cork consists of three rows of flattened tangentially elongated parenchyma cells, followed by one of loose parenchyma and sieve-tubes. The next layer consists of three rows of bast-cells, interrupted by oil-tubes. The succeeding layers are composed of ordinary parenchyma, sieve-tubes, and bast-cells, some of the rows of the latter being interrupted by oil-tubes the same as those described. The medullary rays extend more than half through the bark and consist mostly of a single

Fig. 85.

Leaves of Rhus aromatica, *Aiton.*

row of cells. The oil-tubes are generally in the bast rows, arranged with some regularity. In some of the sections examined three or four of the oil-tubes were found coalesced, as in I. The bark is studded with crystals, which seem to be mostly confined to the portion beyond the medullary rays. The crystals, examined under a high magnifying power, showed them as represented in III (phosphate), IV (chloride), and V (oxalate of calcium), the latter predominating. II, finally, shows a longitudinal section of the bark, in a radial direction, showing the longitudinal arrangement of the tissues, oil-tubes, and crystals, sections of two medullary rays being quite pronounced.

FIG. 86.



RHUS AROMATICA, *Aiton.*—Bark of the root: I, Transverse section; II, longitudinal section; III, crystals of phosphates; IV, crystals of chlorides; V, crystals of calcium oxalate.

The chemical examination of the bark consisted in extracting the bark successively with benzol, alcohol, cold water, boiling water, and solution of carbonate of potassium, and examining the extracts thus obtained. A portion was also subjected to distillation with water, and another portion to incineration. The result is given below. In reference to the volatile oil, it may be said that, when first distilled, it had a disgusting odor resembling very much the odor of bed bugs; but when the distillate is treated with ether, the ethereal solution allowed to evaporate, the oil remaining left in contact with air for twenty-four hours, it acquires a pleasant odor, distinct in itself.

Result of Chemical Examination.

1. Moisture: 6.95 per cent.

2. Ash: 13.85 per cent,	Soluble in water: 16.967 per ct. Insoluble in water, soluble in hydrochloric acid: 74.007 per cent. Insoluble in water and in hydrochloric acid: 9.025 p. ct.
3. Benzol extract: 6.36 per cent.,	Consisting of volatile and fixed oils, resin, wax, and butyric acid.
4. Alcoholic extract: 23.87 per cent.,	Tannin, glucose, and acid resin, "extractive," coloring matter.
5. Cold-water extract: 4.85 per cent.,	Gum and coloring matter.
6. Decoction,	Starch, etc.
7. Carbonate of potassium extract,	Oxalates, etc.
8. Distillation with water,	Volatile oil.

Experience seems to indicate that rhus aromatica is a remedial agent which deserves attention. It has been recommended in the treatment of *diabetes*, *enuresis*, *hæmaturia*, *uterine hæmorrhages*, *menorrhagia*, etc. In the author's experience it is of undoubted value in *enuresis*. A tincture, made with stronger alcohol, 4 ounces to the pint, may be given in doses of 20 drops to a teaspoonful; the fluid extract in doses of 5 to 40 drops; and the powder in doses of 20 to 60 grains.—Am. Jour. Phar., May, 1881, pp. 210–217.

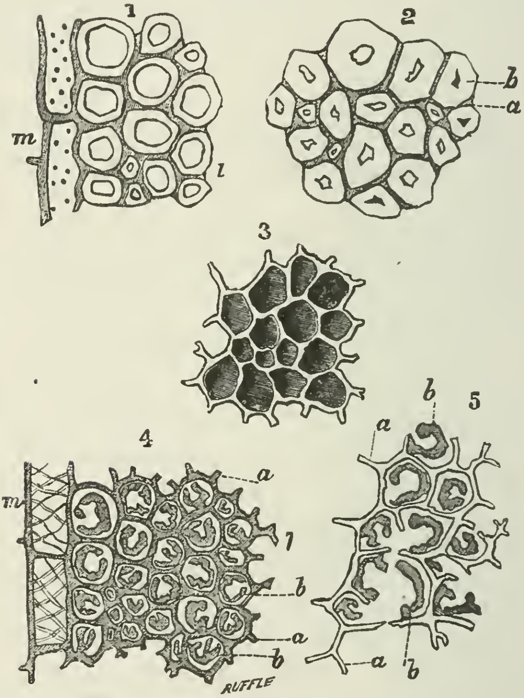
Rhus Toxicodendron—Treatment of Poisoning.—Dr. W. R. D. Blackwood, having suffered personally four attacks of rhus-poisoning, gives in the Philadelphia "Medical Times" his experiences therewith. Speaking of treatment, he declares that the only things he has found serviceable are lime-water and galvanism. A lump of lime, the size of a lemon, in two quarts of water is sufficiently strong, and the parts should be thoroughly bathed, the mixture being stirred each time. Be careful not to let it get into the eyes. It is better to wet the parts repeatedly, allowing them to dry somewhat, than to keep wet cloths on. While applying the galvanic or faradic currents to one hand he has experienced perfect freedom from itching, the other hand being extremely troublesome if not included in the circuit. Mild currents suffice, and the longer the application the more extended the relief afterwards. With galvanism the current should not be interrupted.—New Rem., January, 1881, p. 8.

Myrrh—Examination of Impurities and Substitution.—R. H. Parker, in a previous paper (see Proceedings, 1880, p. 189), referred to numerous kinds of "spurious gums" selected from several bales of unpicked myrrh. He has now subjected them to chemical examination, and gives the results in a paper to Phar. Jour. and Trans., July 17th, 1880, p. 41.

Quebracho Colorado—Origin of Gum.—Dr. August Vogl has examined the wood, known under the name of "Quebracho Colorado," and generally referred to *Loxopterigium Lorentzii*, and communicates the following:

A piece of the wood showed crevices and hollow spaces about eight centimeters long and four centimeters broad, the walls of which were deeply cleft and covered with a remarkable friable, almost black, resinous mass, reminding one of certain species of kino, only red at the angles, transparent, breaking with a conchoidal fracture, and strongly astringent. This evidently was the so-called quebracho gum (described by Pedro N. Arata in "Phar. Jour. Trans.," 1878, p. 531). The heavy, tough, and very hard wood possesses on the whole a very bright brownish-red color. In a polished transverse section it shows bright medullary rays very near to each other, and in the narrow wood rays very numerous vessels as bright spots, and at long intervals from each other run narrow rays of wood parenchyma. About the crevices, above mentioned as being covered with excretion, the wood takes an almost black color, which renders the coarse structures relatively indistinct, and which, finally, quite disappears in the clefts upon which the mass of excretion lies or into which it rather flows. The principal medullary rays, generally three cells broad and usually accompanied on either side by cells containing crystals, consist on the whole of pitted cells, not thick-walled, extended in a radial direction (Fig. 87, 1, *m*); together with these are secondary rays one cell broad. The wood rays have as a ground tissue libriform fibres (1, *l*), besides, to a small extent, wood parenchyma, partly standing alone, partly in simple layers surrounding the vessels. The latter are generally very broad, thick-walled, with bordered pits and large thyllen, sometimes containing crystals, either alone or in radiate groups of two to five, seldom more. The oxalate of lime crystals occurring in the wood are, in part, very large, frequently double, and belong to the klinorhombic system. Sections from the unaltered (bright brownish-red) portion of the wood show, under water, as contents of the tissue, an amorphous mass, colored olive-green by ferric chloride, completely soluble in water, alcohol, and with heat in solution of potash. This mass is more granular and bright red in color in the libriform cells and wood parenchyma, and homogeneous, clotted, and brownish-red in the vessels and medullary rays. The cell-walls appear to be yellowish or reddish-yellow, and indeed the primary (the border layers, 2, *a*) are intensely colored. Long-continued warming in water decolorizes the above, and at the same time there appears considerable swelling of the secondary layers (2, *b*), especially in the vessels and libriform cells. Chloriodide of zinc colors them (but not the primary membrane) violet; iodine with sulphuric acid renders them blue. Sections from the black portion of the wood (3) show an essentially different behavior of the elementary tissues. All are so densely filled with the brownish-red contents that without further treatment it is difficult to understand

Fig. 87.



Structure of Quebracho Colorado.—1, 2, from brownish-red wood (2, boiled in water); 3, 4, 5, from black portion of wood (4, 5, boiled in water); *a*, primary membrane; *b*, secondary layers; *l*, libriform cells; *m*, medullary rays.

the structure. This can only be done by removing the contents of the cells with one of the above solvents. The most remarkable change is shown in the libriform fibres. In a transverse section boiled in water (4) the secondary layers, remarkable by their swelling in the same preparation from the unaltered wood (2), are not visible, but inside the brownish-red primary membrane lie merely the remains of the above in the form of a shrunken colorless skin, separated from the cell-wall by a distinct interval (4, *b*). In a longitudinal section these remains of the secondary deposit appear as thin, thick, or narrow spiral bands. The cells also of the medullary rays in the transverse section (4, *m*) show spiral bands. The nearer to the excreted gum the more evident the changes become. Finally a part is reached where, in a transverse section, after solution of the cell-contents, a thin brown cellular network with polygonal meshes is met with, formed from primary membrane, and corresponding to the fundamental tissue. This shows numerous disruptions (5), especially as it appears in a radial direction. The remains of the secondary layers are visible in single cells only. In the vessels, and especially in the border cells, a withering away of the cell membrane is observed. In the mass of gum which lies immediately on the wood are found only more or less numerous pieces of tissue, in a very shrivelled condition, besides the above remains, and on the exterior the perfectly homogeneous kino-like mass of excretion is seen. If a small portion of the brick-red powder be treated with solution of potash under the microscope, only single crystals of oxalate of lime, of the same form as that in which they occur in the wood, and a few colorless membranous flakes, are observed. The latter, after neutralization with acetic acid and treatment with chloride of zinc, are colored blue, by which they are known as remains of cell-tissue and their origin recognized.

The above-mentioned facts indicate that the so-called "gum" forming constituents appear first of all as cell-contents in the wood; that these, under certain conditions and in some parts, are increased at the cost of the cell-wall; and further that, in the first place, secondary layers undergo this metamorphosis; and, lastly, the primary membrane.—Phar. Jour. and Trans., July 3d, 1880, pp. 1, 2.

AQUIFOLIACEÆ.

Pinos Verticellatus—Proximate Examination.—Mr. Louis Clay Collier determined in the bark of this plant wax, chlorophyll, resin, tannin, glucose, saccharose, albumen, starch, and a bitter principle. The latter, when isolated, constituted an amorphous yellow powder, which, in aqueous solution, afforded precipitates with perchloride of platinum (dark red), nitrate of silver (white), protochloride of tin (white), bichloride of mercury (white), antimoniate of potassium (white), these white precipitates changing variously in color on heating or boiling. The concentrated mineral acids produced heavy white precipitates, and caustic alkalies a cinnamon-brown coloration.—Am. Jour. Phar., September, 1880, p. 437.

URTICACEÆ.

Cannabis Indica and C. Sativa—Absence of Nicotia.—E. L. Seezen has subjected both European and Indian hemp to examination, with the purpose of inquiring into the correctness of Preobraschensky's statement (see "Proceedings," 1879, p. 267), that the latter yielded nicotia to dry distillation (as well as by distillation with caustic potassa, Rep.). Mr. Seezen does not appear to have resorted to dry distillation; but by distillation with caustic potassa, and several other methods recommended for the isolation of nicotia, he was unable to obtain even traces of that alkaloid from either European or Indian hemp.—Phar. Centralh., October 14th, 1880, p. 369.

Wild Hops—Characters, etc.—Mr. Tchech has examined the different varieties of hops grown in the south of Europe. Wild hops grow plentifully in the south of Styria, Croatia, Sclavonia, Servia, and Bosnia, where they are found on vast districts of land; these hops are very hardy and yield an abundant crop, which might be utilized far better than it is. The author found that these wild hops contain from 5 to 8 per cent. of tannin, that is to say, considerably in excess of ordinary cultivated hops; they might, therefore, be advantageously used for the clarification of beer-wort. His experiments lead to the conclusion that these wild hops may be profitably mixed with Bohemian and other cultivated hops. They contain about one-third of the lupuline and essential oil found in ordinary hops, but being so rich in tannin they are in some cases preferable.—Drug. Circ., June, 1881, p. 93.

BETULINEÆ.

Birch Tar—Medicinal Uses, etc.—Professor J. M. Maisch, in connection with *tinctura rusci* (which see), which has recently come into some use, gives some information respecting birch oil, or birch tar, which may find place here. Its common name is *degutt* or *dagett*, and it was formerly employed in medicine and in veterinary practice under the following names and synonyms: *Oleum betulinum, s. rusci, s. russicum, s. moscoviticum, s. lithuanicum.* It is largely manufactured in Russia and Poland from birch bark, by a process of descending distillation, similar to that employed in the preparation of ordinary tar, but has a peculiar odor, and is used in the manufacture of Russia leather, which owes to it its peculiar odor. It probably contains the principal constituents of common tar, but also contains, according to

A. Sobrero (1842), a pale yellow oil, having an agreeable odor, an acid reaction, and a composition of $C_{10}H_{16}$. It is soluble in alcohol and ether, and is a solvent for resins. It congeals partly at —16° to —17° C. (about 2° F.), and boils at 156° C. At present, birch tar appears to be mainly employed in skin diseases, and an ointment (see *Pomatum rusci*) is often sold in New York as *Hebra's tar pomade*.—Am. Jour. Phar., February, 1881, p. 55.

CONIFERÆ.

Turpentine—Collection, Distillation of Oil, etc.—Dr. Thomas F. Wood contributes an interesting paper, in reply to questions, suggested by Professor Flückiger, respecting some points connected with the manufacture and commerce of crude turpentine and rosin. From this it appears that three grades of turpentine are subjected to distillation: "*virgin turpentine*," the first exudation from newly chipped trees, which yields about 6 gallons of oil per barrel, and the so-called "window-glass rosin," of which there are two or three grades; "*yellow dip turpentine*," which is the running of the second and subsequent years, yields about 4 gallons of oil per barrel, and furnishes the medium grades of rosin; and the "*scrapings*," which are composed of the inspissated gum of the tree facings, yield only about 2 gallons of oil per barrel, and an inferior rosin, which varies from very dark to almost black—the latter being always produced from this source, and not, as has been stated, by burning in the still. Opaque rosin is accidentally produced, and is formed by the presence of water. The greater part of the stock produced, however, is anhydrous. Formerly iron stills were used for the distillation of oil of turpentine. Now copper stills, having a capacity of about 15 barrels (220 pounds each) are exclusively used. The charge being unloaded, heat is applied until the mass attains a uniform temperature of 212° to 316° F. and continued until the water, naturally contained in the crude turpentine, has come over. The product is known as "low wine," and contains pyroligneous and formic acids, ether and methylic alcohol. A small stream of cold water is now let in, so that the temperature will remain at or below 316° F. The distillation is continued in this way, until the distillate passes over in the proportion of 9 of water to 1 of oil, when the heat is withdrawn. The oil is separated from the water by appropriate means. The rosin is drawn off, by means of a valvular cock at the side of the still near the bottom, into a tank, passing in its passage through a strainer, and is from thence ladled into barrels.

Rosin oil is produced from the lower grades of rosin by heating in a still to 316° to 320° F. until water and naphtha no longer come over; the heat is then increased to near the red heat of iron, when the rosin boils, and water and oil of rosin distil over together. The *crude rosin* *oil* produced is a heavy, nearly opaque, whitish viscid fluid, opalescent on the surface. By redistillation, the resulting oil is transparent, dark red by transmitted light, with a decided bluish cast by reflected light. It is more deeply opalescent than petroleum oil. The residue in the still is a black mass, having a shining fracture, and giving the hues of crystal aniline.—New Rem., October 1880, pp. 289–291.

Balsam Fir—Destruction by Insects.—Mr. Charles H. Peck, in a recent report to the Regents of the University of the State of New York, also draws attention to the balsam fir, *Abies balsamea*, Marshall, and among other causes that favor the destruction of this valuable tree, mentions a small beetle belonging to the genus *Tomicus*, of which it is probably an undescribed species. This beetle perforates the bark, excavates its furrow along the inner surface in a horizontal direction, and deposits its eggs along the sides of the furrow, which is less than one-sixteenth of an inch in diameter. As soon as the eggs are hatched, the larvæ begin to mine furrows of their own at right angles to the original gallery, one part eating their way upward and another downward between the bark and the wood. These larval galleries are nearly parallel to each other, and are at their beginning so minute that they are scarcely perceptible to the naked eye ; but as the larva advances in its course, it increases in size, and the diameter of its furrow increases in like manner. The larvæ were found (in some cases transformed to the mature beetle) each in the larger end of its own furrow. It will be observed from the direction of the original furrow how powerful an agent for mischief this minute beetle is. Its work is carried on in the most vital part of the tree. Three or four beetles attacking the trunk at or about the same height, and on different sides of the tree, would completely and effectualy girdle it and destroy life. The length of the original furrows appeared to be less than four inches. The beetle itself is scarcely more than one line long. The author observed the inroads of this beetle in several groves along the road between Summit and Jefferson, in Schoharie County, New York. —New Rem., September, 1880, p. 267.

Fir-cone Resin—Uses in Greece.—Professor X. Landerer states that the scales of fir-cones exude a resin in drops or tears which is called in Greece *δάκρυα-ἐλαττοπίσσα* ("tear-fir-resin") and corresponds to "*lachrymæ turionum abietis.*" Fir-trees, the cones of which are thus covered with numerous fragrant and aromatic tears, are much in demand as an ornament for flower-gardens and parks. The resin itself, *ἐλαττοπίσσα*, is used as a popular remedy in blennorrhœa, and produces as good and speedy effects as balsam of copaiba, cubebs, or oil of sandal. —New Rem., August, 1880, p. 231.

Taxus Baccata—Constituents.—D. Amato and A. Capparelli have isolated from the leaves of the yew a colorless, crystalline alkaloid,* having a musty odor, and producing dense white fumes with the vapors of hydrochloric acid. It is sparingly soluble in water, freely soluble in alcohol and ether, and yields precipitates with several reagents for alkaloids. those with solution of iodine in iodide of potassium, and with tannin (? Rep.) becoming crystalline. The authors also obtained a volatile oil resembling that of wild fennel in odor, and a colorless non-nitrogenous principle, crystallizing in stellate needles, and sparingly soluble in cold, but freely soluble in hot alcohol.—Am. Jour. Phar., February, 1881, p. 56; from Gaz. Ital., X, p. 349.

Sequoia Gigantea—Presence of a New Hydrocarbon.—G. Lunge and Th. Steinkauler have distilled with steam the needles from the branches of the California "Sequoia," and, after extracting with ether, have separated therefrom a solid body and an oil. The solid is quite soluble in the ordinary solvents, and could only be crystallized by putting a layer of water upon the solution in glacial acetic acid, so that by gradually mixing it might cause the separation of the solid. In this way it was obtained in the form of well-crystallized scales, which were white, with faint blue fluorescence, and possessed a very penetrating odor of the sequoia, which resembled somewhat the odor of oil of peppermint. The fusing-point was 105° C.; the boiling-point between 290° and 300° C. Its composition corresponds to the formula $C_{13}H_{10}$, which is confirmed by the vapor density. This formula corresponds with fluorene, from which, however, by its fusing-point (fluorene $=$ 113° C.) and the very characteristic odor, the author therefore calls the new body Sequoiene. The oil accompanying it they have not yet fully investigated.—Am. Jour. Phar., November, 1880, p. 548; from Ber. d. Deutsch. Chem. Ges., XIII, p. 1656.

B. ANIMAL DRUGS.

Musk-Deer—Occurrence in Tibet.—As some degree of doubt seems hitherto to have prevailed among naturalists whether the musk-deer (*Moschus moschiferus*) occurs in the Tibetan plateau, or whether it is confined to the wooded districts of the Alpine Himalaya, Mr. R. Lydekker has contributed to the "Journal of the Asiatic Society" of Bengal a brief paper, in which he gives the result of his recent investigations into the subject. Mr. Lydekker says that during the summer of last year he met in Lahul a Tibetan, who had formerly occupied a high official position of Lhasa, and who informed him that the

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* The alkaloid of the yew (leaves and reed) was first isolated by Lucas in 1843, and further investigated and described by Marmé (see Proceedings, 1876, p 367), who named it *taxina.*—Rep.

musk-deer was of common occurrence on the Tsanpu River, in the neighborhood of Lhasa. He has also learned from Mr. W. H. Johnson, British Commissioner in Ladakh, that it is found in the country below, and to the east of Lhasa, along the course of the Tsanpu River. The musk brought from this district, Mr. Johnson says, has wrongly acquired the name of Khoten musk; this appears to have originated from the fact that Khoten being a large Buddhist city and important trading-place, the músk was carried there from Lhasa, and thence to India. Mr. Johnson also observes, that the musk-deer occurs only where the birch tree grows. This evidence, added to what has been collected from various works on Tibet and the neighboring regions, appears to Mr. Lydekker to show that a species of *Moschus* occurs in Tibet, though he has no means of knowing whether it be the same as *M. moschiferus*.—Phar. Jour. Trans., April 16th, 1881, p. 860; from Jour. of Applied Sciences, February 1st, 1881.

Musk—Disguise of the Odor by Quinine.—Mr. Bargos, preparing pills of quinia sulph., 10 grs.; musk, 3 grains; mucilage, q. s., observed when the pills were finished, that the odor of musk was completely extinguished, the odor of liquorice powder, in which the pills were rolled, alone remaining.—New Rem., June, 1881, p. 180; from Rép. de Pharm. and Arch. d. Pharm.

Frog Poison—An Arrow-poison of the Natives of Colombia.—Mr. Ed. André describes the method by which the Indians of Colombia obtain a powerful arrow poison from frogs, which he regards to be a variety of *Thylobates bicolor*. It is a small, lank animal, of lemon-yellow color above, with black legs and abdomen, which is met with in the *tierra templada*, at an elevation of 1500 to 2000 meters above the level of the sea. In the province of Chocó it is called *neaará*. To obtain the poison, the Indians, having guarded their hands by winding around them broad leaves, inclose the frog in a piece of bamboo, and suspend it by the hind legs over fire. This causes the frog to exude an acrid yellow liquid, which is caught by a woman, who collects it by means of a sort of scraper or spatula in a small earthen vessel, in which it gradually assumes the consistence of curare. The arrows are not dipped into the poison until the latter has solidified. In this condition the natives carry it with them in their quivers. The effects of the poison are said to be precisely similar to those of curare, as it is innocuous when swallowed, but, if introduced into the blood, speedily causes a paralysis of the vital powers. An antidote is not known, and death is very speedy.—New Rem., July, 1880, p. 196.

Cantharides.—Dr. Carl F. Gissler enumerates one hundred and fifty-eight species and varieties of blistering beetles which occur in the United States and the bordering provinces of Mexico and British

North America. Attention is drawn to the species that are of common occurrence, of those that occur less frequently, and of those that are rare, and also the places of their occurrence. It might be profitable to determine the cantharidin in the available species. The mode of collecting and killing them is the same as in the case of cantharides: oil of turpentine or ether being excellent for the latter purpose. Their identification may be secured by sending good specimens, wrapped in tissue-paper, in a paper box, as third-class mail matter, to Professor C. W. Riley, Washington, D. C., or to George H. Horn, M.D., 874 N. Fourth Street, Philadelphia, Pa.—D. A. Apothek. Ztg., July 1st and 15th, 1880, p. 2.

Leeches—Preservation.—Mr Schwonder finds that by keeping leeches in a stoneware pot, filled one-half with pieces of peat and to three-fourths with water, in a room capable of being heated in winter, and at least one story above the ground, they will keep perfectly. The water need only be changed occasionally, say once in three weeks, and then the peat is to be washed with water.—New Rem., March, 1881, p. 84; from Phar. Zeitung.

Sponges—Method of Cleansing and Preserving.—Mr. Charles Roberts finds that returning the sponge to its native element, or what answers equally well, steeping it in strong salt and water, to which a few grains of iodine have been added, enables it to throw off its impurities and to regain its normal elasticity and absorbent properties, and at the same time to become completely disinfected. The process is, however, not a rapid one. Very dirty sponges must have a preliminary cleaning by washing in soap and warm water. Sponges may be kept in this kind of pickle for any length of time without injury to their texture. Preparations of chlorine, soda, and sulphurous acid, he says, injure the texture of the sponge; Condy's fluid stains, and carbolic acid consolidates organic matter in the meshes of the structure.—Drug. Circ., June, 1881, p. 87; from Br. Med. Jour.

INORGANIC CHEMISTRY.

OXYGEN.

Oxygen—Care in Preparation.—Limousin draws attention to an explosion which occurred in the laboratory of Ardisson & Ponzis, apothecaries at Cannes. By the direction of Dr. Botkin, Mr. Ardisson prepared some oxygen for the Empress of Russia from chlorate of potash without the usual intervention of peroxide of manganese, the physician believing thereby to secure a purer product. At the beginning the decomposition took place regularly, but during the second period, when the decomposition always becomes more energetic, owing to the decomposition of the perchlorate of potassa formed, an explosion suddenly occurred in the gasometer—fortunately without serious consequences to the operator. The retort as well as the wash-bottle remained intact. Mr. Limousin accounts for this by assuming that particles of perchlorate of potassium were carried over into the vulcanized rubber tube, which, owing to the high temperature of the particles, became ignited, and produced carburetted hydrogen. The carburetted hydrogen with the oxygen in the gasometer produced an explosive mixture, which, under the influence of the high temperature, and possibly also under that of particles of burning sulphur or perchlorate of potassium, became ignited. The author observes that it is not at all an uncommon occurrence to see burning particles pass through the wash-bottle in the tube beyond when the reaction is very violent. Under the conditions above presumed an explosion is then inevitable.—Phar. Centralh., November 4th, 1880, p. 400, from Jour. de Phar. et de Chim.

Ozone—Color, and Liquefaction.—P. Hautefeuille and J. Chappuis obtained a mixture very rich in ozone by the action of electricity on oxygen at a very low temperature. This mixture was transferred to the capillary tube of Cailletet's apparatus, and submitted to pressure, at a temperature of —23°. At the first few strokes of the piston an azure-blue was seen to fill the tube, and as the pressure increased the color deepened, until when the gas was under a pressure of several atmospheres, the color had become indigo-blue. When the pressure was suddenly removed, a momentary white mist was observed within the tube, indicating a condensation into the liquid, or perhaps solid state. The blue color, being like its odor, an essential property of ozone, may be seen whenever a sufficient thickness of a mixture containing it is viewed. The authors propose to discuss the agency of ozone as affecting the color of the atmosphere.—Jour. Chem. Soc., February, 1881, p. 18, from Compt. Rend., 91, pp. 522–525.

HYDROGEN.

Sulphuretted Hydrogen—Simple Apparatus.—Mr. Peter Hart constructs a simple apparatus, which is useful when sulphuretted hydrogen is only occasionally required, and can be used frequently without washing or replenishing. It consists of two test-tubes, the larger of 1 inch internal diameter, the other of such smaller diameter as to slide easily without friction into the larger. This smaller tube is by means of the blowpipe perforated at the bottom with a ¼-inch hole, and is also provided with a rubber-stopper and a gas-leading tube bent twice at right angles. The larger tube has a piece of rubber tube 2 inches in length, and of rather smaller diameter than itself, pushed over its mouth, 1 inch on the tube and 1 inch projecting. This completes the apparatus. To work it fill the larger tube from one-third to one-half full of a mixture of 1 part of sulphuric acid and 3 parts of water. Drop a lump of sulphide of iron into the smaller tube, insert the stopper with the leading pipe into this, and thrust its lower perforated end through the rubber mouth of the larger tube until it reaches the acid, allowing sufficient of this to enter to cover the sulphide of iron. Gas immediately commences to be evolved, and may be stopped at will by raising the tube again until it is out of the acid. Obviously the dimensions of the apparatus may be increased.—Chem. News, April 29th, 1881, p. 191.

Water—Simple Method of Determining Temporary Hardness.—In order to ascertain the alkalinity of springs on the spot, with samples not exceeding 10 cc., and with a single reagent, V. Wartha makes use of a tube 30 to 40 cm. long, closed at the bottom, and with a mark showing the capacity of 10 cc. From this mark upwards the tube is graduated into 0.1 cc. To determine the temporary hardness the tube is filled to the lowest mark with the water in question, and a little filter-paper, which has been previously steeped in extract of logwood and dried, is thrown in, thus giving the water a violet color. Centinormal hydrochloric acid is then added from a dropping bottle, till the color of the liquid inclines to an orange. The tube is then closed with the thumb and well shaken. The greater part of the carbonic acid escapes, and the liquid becomes red again. Acid is again added, and the shaking repeated until the next drop of the acid turns the liquid to a pure lemon-yellow, a point which with a little practice is easily reached. The amount of acid used is read off on the tube itself. The author proposes to express the alkalinity of a water by the number of cc. of centinormal acid needed to neutralize 10 cc. He thinks that this method will be found useful both for sanitary and geological purposes.—Chem. News, June 24th, 1881, p. 292, from Ber. d. D. Chem. Ges., 13, No. 11.

Water—Application of Nitro-phenic Acid as an Alkalimetric Indicator.—H. W. Langbeck observes that if nitro-phenic acid is dissolved in 100,000 parts of water a nearly colorless liquid is produced, but if a trace of an alkali be added a distinct yellow color appears. This delicate indicator is, however, only useful if colorless or nearly colorless fluids are to be examined, as, for instance, in determining the temporary hardness of water. For this purpose 1 part of the acid is dissolved in 500 parts of distilled water. Centinormal solutions of potassa and of acetic acid are also prepared. 100 cc. of distilled water are put into one Nessler glass, the same quantity in another, and 100 cc. of the water to be examined into a third. To each of them 5 cc. of the nitro-phenic acid solution are added (one is kept for comparing), which leaves the distilled water nearly colorless, while the common water turns yellow to deep yellow according to hardness. From a burette centinormal solution of potash is then added to the one glass of distilled water until the color is of the same shade as that of the common water: each cc. used is equal to 0.00028 of CaO. To verify the result, centinormal acetic acid is now added until the first shade (nearly colorless) returns; the quantity of acid required should be the same as that of alkali. The common water is now treated with acid until the first shade is reached; each cc., in excess of the quantity required for the first liquid, indicates 0.0005 of carbonate of lime.—Chem. News, April 8th, 1881.

Water—Use of Citric Acid to Render it Potable.—According to Dr. Langfeldt, the addition of 1 p. citric acid to 2000 p. water containing animalculæ, will cause the death of the latter in about a minute, after which they will settle rapidly to the bottom of the vessel, leaving the supernatant water in a potable condition.—New Rem., May, 1881, p. 147.

Muddy Water—Purification.—Mr. R. F. Fairthorne has found that the excessively muddy water which has been supplied in Philadelphia, may be well and expeditiously clarified by agitating it with phosphate of lime (1 ounce to 1 quart) and allowing it to settle. In a few days it may be filtered through absorbent cotton, or through cotton which has been moistened with alcohol and then washed with water. The cotton should be pressed tightly into the neck of the funnel.—Am. Jour. Phar., August, 1880, p. 407.

NITROGEN.

Nitric Acid—Quantitative Determination.—O. von Dumreicher has found that nitric acid is converted by acid stannous chloride into ammonia without any evolution of gas. This fact is applied to the determination of nitric acid. The substance is boiled for an hour with a large excess of acid stannous chloride solution (16 p. tin dissolved in 60 p. of 40 per cent. hydrochloric acid), and then evaporated over the water-bath until a crystalline scum begins to form. In this residue of evaporation the ammonia can be determined in the usual way. —Am. Jour. Phar., February, 1881, p. 59, from Ber. d. Chem. Ges., XIII, p. 2241.

Nitric Acid—Spontaneous Combustion Engendered.—The question whether nitric acid is able to cause an ignition of vegetable tissue has often been discussed, without apparently having been settled. K. Kraut describes some experiments, which prove that the breakage of a vessel, containing nitric acid of specific gravity 1.5, in a box containing hay, sawdust, and straw, is capable of engendering spontaneous combustion, while with nitric acid of specific gravity 1.45 no such inflaming is produced.—Am. Jour. Phar., April, 1881, p. 170, from Ber. d. Chem. Ges., XII, p. 301.

R. Haas has since described some experiments bearing upon the same subject. He finds that when hay or straw is packed thoroughly so that no air-spaces are left between, and when the acid is added at several times as the material is packed in layers, acid of 1.39, or ordinary commercial nitric acid, can give rise to spontaneous combustion. The only essential conditions seem to be a compact packing so that the heat of the reaction is not dissipated, and a thorough saturation of the material with the acid. In cases of accidents from breaking of nitric acid flasks in transport these conditions are often present, and hence the resulting fires.—Am. Jour. Phar., May, 1881, p. 233, from Ber. d. Chem. Ges., XIV, p. 597.

SULPHUR.

Sulphuric Acid—New Method of Manufacture.—A Houzé brings sulphurous acid, watery vapor, and air in contact at a high temperature, but below redness, and condenses the product in a series of earthenware vessels.—Chem. News, August 13th, 1880, p. 85, from Chem. Industrie.

Sulphuric Acid—Purification.—According to F. Selmis, sulphuric acid can be readily freed from arsenic if the sulphuric acid, diluted with half its bulk of water, be distilled after addition of some plumbic chloride. All the arsenic goes over with the first portions of the distillate as arsenic chloride.—Am. Jour. Phar., August, 1880, p. 399, from Ber. d. Deutsch. Chem. Ges., XIII, p. 725.

Sulphuric Acid—Action on Platinum Vessels During Manufacture.—Mr. Scheurer-Kestner concludes from his experiments that absolutely pure sulphuric acid does not attack platinum, and that by making use of sulphate of ammonium as recommended by Pelouze we may almost completely avoid injury to platinum vessels. Sulphuric acid containing traces of nitrous acid dissolves platinum, and the activity of this process increases with the concentration of the process. The acid from the lead chambers, even when containing an excess of sulphurous acid, attacks platinum, the nitrous acid resisting the action of the sulphurous acid, and being in a state of stable combination. Hence the corrosion of platinum is always due to the presence of nitrogenous compounds in the sulphuric acid. One part in 10,000 suffices to dissolve a proportion of platinum such as is never observed industrially. To ascertain whether an acid is sufficiently free from nitrogenous compounds the most sensitive reactions are necessary. An acid in which ferrous sulphate scarcely reveals visible traces of nitrogen compounds is colored blue by diphenylamine. It contains both sulphurous and nitrous acids, and it attacks platinum. During its concentration the quantity of nitrous acid scarcely diminishes, whilst the sulphurous acid is completely expelled.—Chem. News, July 30th, 1880, p. 61, from Compt. Rend., July 5th, 1880.

Lead Chamber Crystals—Value as Disinfectant, etc.—According to C. Girard and I. A. Pabst, the lead chamber crystals, consisting of nitrosyl-sulphate, may be employed for deodorizing the gases evolved in the manufacture of sulphate of ammonium, in the drying of night soil, etc., by passing them through towers charged with coke, down which a solution of the crystals trickles. The gases should not contain more moisture than an ordinary saturated atmosphere, and should be brought to that state by cooling before they enter the tower. The waste acids from the manufacture of gun cotton and nitrobenzene may be used for this process. Nitrosyl-sulphate has many advantages over chlorinated lime as a disinfectant, notably that the sulphuric acid left may be used in the manufacture of sulphate of ammonium and superphosphate, whereas the residue from bleaching powder is practically useless.—Jour. Chem. Soc., June, 1881, p. 476, from Bull. Soc. Chim. (2), 35, pp. 98–100.

Mr. Sulliot finds that chamber crystals, recommended as a disinfectant by C. Girard and Pabst, give off vapors too irritating for use in hospitals, etc. He proposes to render them supportable by placing the crystals in porous cylindrical vessels, surrounded by a second vessel containing alcohol. Vapors of nitrous ether are evolved.—Chem. News, May 20th, 1881, p. 232, from Comp. Rend., April 4th, 1881.

Sulphuric Acid—Treatment of Burns.—Mr. Alanose relates a case of serious burns in the face caused by the explosion of a flask containing boiling sulphuric acid. The remedy applied was a soft paste of calcined magnesia and water, with which the face was covered, in layers two millimeters in thickness. The intense suffering which was first experienced ceased entirely about a quarter of an hour after the application of the remedy, and, although the magnesia requires to be renewed in the course of twenty-four hours in the case of a severe burn, the patients after recovery retain no marks of the accident.—Am. Jour. Phar., March, 1881, p. 118; from Bull. de Thérap.

Sulphates—Decomposition by Boracic Acid.—Tate ("Jour. Chem. Soc.," 12, p. 160) already pointed out that boracic acid displaces sulphuric acid, though incompletely. J. Degen applies this to the preparation of sulphuric acid from sulphate of sodium. Equivalent proportions of this salt and boracic acid, previously well mixed, are introduced into a retort of hard glass. The mixture is then heated over its melting-point, which is reached very rapidly, and the very pure sulphuric acid (provided the ingredients were in a proper condition) which distils over may be collected in a suitable receiver. Mr. Degen suggests a receiver simply cooled with water, but this is properly criticised as being dangerous in case of accidental breakage, and it is therefore suggested to use a retort and receiver with a long neck only. —New Rem., February, 1881, p. 53; from Schweiz. Wochensch. f. Ph.

CHLORINE.

Chlorine—Preparation.—J. Townsend has succeeded in utilizing the almost worthless chloride of magnesium obtained in working the Stassfurt salts. A solution of the refuse salt, of 40° to 50° C., is mixed with about 10 per cent. of manganic oxide, and by means of hot air, heated to 113° C., chlorine is developed, and may be maintained continually by adding hydrochloric acid from time to time.—Am. Jour. Phar., March, 1881, p. 248; from Chem. Ztg., 1881, p. 198.

Chlorine—Solubility in Water.—According to Berthelot, the rate of solubility of chlorine in water depends upon the duration of the passage of the gas, the temperature, and the influence of light. Water at 12° C., at normal pressure, dissolves 4 grams of chlorine per liter. This appears to be the highest amount, although on protracted passage of the gas even 6 grams could be made to dissolve; but it is probable that, in the latter case, oxychlorine compounds were formed. And this is also probably the explanation of the solubility observed by Pelouze, namely, 8.2 grams of chlorine at 10° C. in 1 liter of water. —From Comptes Rend. and J. Chem. Soc.; in New Rem., April, 1881, p. 119.

Chlorine—Chlorochromic Acid Test.—The red-brown colored acid obtained by distilling a mixture of potassium dichromate, sodium (or any other) chloride, and sulphuric acid, is by no means new as a test for chlorine, but heretofore the operation has generally been conducted in a retort, and took some time. W. Riley has modified the process, so that it is very simple. The well-mixed and finely powdered mixture of potassium dichromate (1 part), a chloride or the substance suspected to be or containing a chloride (1 part), is introduced into the bottom of a beaker-glass, some sulphuric acid (3 parts, or less) is added, and a slightly smaller beaker-glass suspended inside the other at a distance of about 2 to 3 cm. (¾ to 1¼ inch) from the mixture. A little ice, or ice and salt, having been placed into the smaller beaker, a gentle heat is applied to the outer, when chlorochromic acid will be given off, if any chloride was present, and will condense on the bottom of the smaller beaker-glass. In place of the latter a watch-glass may be taken. The drops adhering to either the beaker or watch-glass are mixed with a drop of ammonia, then with acetic acid in excess, and finally with a solution of acetate of lead, which latter produces a distinctly perceptible precipitate of chromate of lead, even if the quantity of chlorochromic acid present has been so small that it could not be recognized by its change of color on coming in contact with the ammonia. Presence of iodine is apt to interfere with this reaction.—New Rem., August, 1880, p. 246; from Chem. News.

Chlorine—Determination in Presence of Bromine and Iodine.—According to G. Vortman, in testing for chlorides in the presence of bromides and iodides, it is sufficient to boil the substance in an acetic solution with peroxide of lead until the liquid, on settling, is colorless and has not the slightest odor of iodine or bromine. The bromine and a part of the iodine escape as such; the remainder of the iodine remains as iodide of lead along with the excess of peroxide of lead. On filtering and washing the precipitates, all the chlorine is found in the filtrate free from bromine and iodine. In this manner the chlorine may be determined quantitatively. If the quantity of chlorine accompanying the iodine is considerable, peroxide of manganese is preferable to peroxide of lead, as otherwise the liquid must be largely diluted with water to prevent the chloride of lead from depositing. In determining large quantities of chlorine in presence of bromine, it is well to add along with the peroxide of lead some sulphate of potassium, so that the chlorine may be found in the filtrate combined with potassium. In order to expel the liberated bromine and iodine more rapidly, a moderate current of air may be passed through the solution in the water-bath.—Am. Jour. Phar., September, 1880, p. 465; from Chem. News, June, 1880.

Gaseous Hydrochloric Acid—Preparation.—L. L. de Koninck prepares hydrochloric acid by the action of concentrated sulphuric acid on chloride of ammonium, the advantage of the method consisting in the regularity of the action, and in the residue of sulphate of ammonium being non-crystalline and syrupy.—Jour. Chem. Soc., April, 1881, p. 138, from Zeits. Anal. Chem., 1880. pp. 467, 468.

Hydrochloric Acid—Preparation of the Gas.—Ernest Solvay prepares gaseous hydrochloric acid by a method which is based upon the fact that a concentrated aqueous solution of chloride of calcium holds back water at a temperature at which it will not absorb hydrochloric acid gas. If a concentrated solution of chloride of calcium is therefore saturated with gaseous hydrochloric acid, and the solution is then heated, the hydrochloric acid escapes in a perfectly dry state. From aqueous hydrochloric acid the gas is also liberated in a dry state on addition of chloride of calcium and heating.—Am. Jour. Phar., June, 1881, p. 293, from Chem. Indus., 1881, p. 117.

Hydrochloric Acid—Test of Purity.—G. A. Ziegler makes the test for the presence of arsenious acid and sulphurous acid in hydrochloric acid in one operation. The apparatus is constructed of a large and two small wide-mouthed bottles. Hydrogen is generated in the larger vessel, in the usual manner, from the suspected acid and pure zinc. The smaller vessels are filled to one-half their capacity with distilled water, the one nearest the gas generating bottle containing a few drops of ammoniacal chloride of copper solution, the other a drop of solution of nitrate of silver. In the presence of even traces of sulphurous acid, the sulphuretted hydrogen formed produces a black stain at the exit of the tube reaching into the copper solution, and as long as that solution retains its blue color, however faint it may be, no sulphuretted hydrogen can pass into the silver solution, in which any arsenuretted hydrogen is evidenced by the well-known reaction. In the presence of very large quantities of sulphurous acid, the quantity of copper salt must be increased.—Phar. Centralh., July 15th, 1880, p. 247.

Chlorinated Lime—Formation and Constitution.—Notwithstanding that this subject has been much investigated, there is still great difference of opinion regarding the formation and constitution of bleaching-powder. G. Lunge and H. Schäppi have now made comprehensive experiments, whereby they have reached some interesting results and conclusions. They have found that the amount of water present in the lime exerts a very decided influence on the amount of available chlorine in the product. Operating with dry chlorine and with samples of lime containing: 6.5, 13.6, 17.6, 21.6, 24, 26, 27.8, 28.2, 30.1, 31.8 per cent. of water respectively, the available chlorine in the products was found to be as follows:

9.06, 32.86, 37.38, 38.82, 40.71, 40.89, 43.10, 40.36, 38.37, 36.85 per cent.

The view that perfectly dry hydrate does not absorb chlorine, is not correct, but then the chlorine must carry the moisture. The strongest bleaching-powder, containing 43.42 per cent available chlorine, can be produced with perfectly dry chlorine. This is the case when the lime contains 4 per cent. more water than is necessary to form a hydrate. When chlorine contains moisture, the lime used must contain correspondingly less water, so that the end product may be the same.. From the analysis of a good laboratory sample of bleaching-powder, containing 43.13 per cent. of available chlorine, the authors have calculated the following composition: $CaOCl_2$, 88.08; $CaCO_3$, 0.96; $CaCl_2$, 0.45; $Ca(OH)_2$, 6.74; H_2O, 3.77.

The authors express the opinion that no formula of bleaching powder can be correct in which chloride of calcium appears, since in the presence of a little moisture almost all the chlorine is expelled by carbonic acid. They condemn the formulas of Gay-Lussac, Kolb, Stahlschmidt, and others as impossible, and support Odling's Cl — Ca — OCl as being sufficient to explain all observed appearances.—Jour. Chem. Soc., November, 1880, pp. 789–791, from Dingl. Polyt. J., 237, pp. 63–73.

Hypochloric Acid—Characters.—G. Schachert and E. Fürst find the boiling-point of hydrochloric acid, under a pressure of 730.9 mm. to be 9 9° C., and that under this pressure it may be distilled without undergoing decomposition, provided organic substances are carefully excluded. Permanganate of potassium oxidizes it to chloric acid. Regarding its constitution, the authors conclude that in its gaseous condition it is a non-saturated compound, which forms with other non-saturated compounds either addition products, or its molecule is split, and thereby produces energetic oxidation.—Chem. Ztg., March 10th, 1881, p. 165, from Lieb. Annal., 206, p. 68.

Chlorates—Behavior in Hot Solutions.—G. Lunge observes, that on passing chlorine into milk of lime, 5 molecules of chloride should be produced to 1 molecule of chlorate, but that an excess of chloride is always found; this is commonly supposed to be partly due to the evolution of oxygen, especially on heating. He found, however, that solutions of chlorate of potassium remain unchanged on boiling, and that a solution of chlorate of calcium mixed with excess of chloride of calcium, suffered no change on long boiling.—Jour. Chem. Soc., May, 1881, p. 312, from Dingl. Polyt. Jour., 238, pp. 69–77.

BROMINE.

Bromine—Reagent-Solution.—Water takes up very small quantities of bromine; hence De Koninck prefers to use a 10 per cent. aqueous solution of bromide of potassium as solvent. This takes up a large quantity of the bromine, and the solution answers all the purposes of an oxidizing agent—the conversion of As_2O_3 into H_3AsO_4, etc.—for which bromine water is usually employed.—Phar. Centralh., February 17th, 1881, p. 80.

Bromine and Bromides—Detection of Iodine.—According to A. Jorissen, a few drops of the bromine in question are placed in a small porcelain capsule, 30 cc. of a solution of potassium chlorate, saturated in the cold, are added, and the liquid is boiled till colorless. The solution is then poured into a test-tube, allowed to cool, mixed with a few drops of a solution of morphine sulphate and a little chloroform. If the chloroform takes a violet color, iodine was present in the sample. The morphine solution is prepared by dissolving 0.5 gm. morphine in an excess of dilute sulphuric acid, and diluting to 50 c.c. In examining potassium bromide, the solution is mixed with 2 or 3 drops of pure bromine water, and a few c.c. of a cold saturated solution of potassium chlorate, and further treated as above.—Zeitsch. f. Anal. Chem. and Chem. News, December 23d; New Rem., March, 1881, p. 81.

Bromide of Potassium—Colorimetric Determination of Chlorine.—Dr. Carl Roth observes that if bromide of potassium containing chlorine is distilled with sulphuric acid and bichromate of potassium, and the oxychloride of chromium evolved is passed into water containing ammonia, it is known to be resolved into chloride of ammonium, water, and chromate of ammonium. On this reaction the author bases a colorimetric method of determining the percentage of chlorine in the bromide, since the dilute solutions of neutral chromate of ammonium display very decided differences in intensity of color. One gram of bromide of potassium is ground to a powder with approximately the same quantity of bichromate of potassium, and the mixture is introduced without loss into a small flask, where it is drenched with about 5 c.c. of concentrated sulphuric acid. The flask is then connected by means of a tube ground so as to fit air-tight with a receiver containing 50 c.c. of very dilute ammonia. All the chlorine is driven over by the application of a gentle heat as oxychloride of chromium, which is decomposed on entering the receiver in the ordinary manner. A regurgitation of the ammoniacal liquor into the flask is prevented by two balls blown on the connecting tube. After the completion of the operation, the contents of the receiver are introduced into a measuring cylinder, and diluted with water to 100 c.c. For comparison, there are used solutions of neutral chromate of ammonium of known strengths, 152 parts of chromate of ammonium corresponding to 71 parts of chlorine; the preparation of solutions for comparison of different strengths will readily suggest itself.—Chem. News, February 4th, 1881, p. 61; from Chem. Indust., July, 1880.

Bromide of Potassium—Contamination with Lead.—O. Maschke has observed bromide of potassium which does not dissolve clear until after the addition of acid. It occurs in form of crystals, which are a combination of octahedra and cubes, the former predominating, and, when these are large enough, they are remarkable for their transparency. This salt gives a very decided reaction for lead, readily evidenced by sulphide of ammonium, chromate of potassium, etc.—Schweiz. Wochenschr. f. Phar., February 18th, 1881; from Phar. Ztg., 1880, No. 96.

Hydrobromic Acid—Preparation.—Mr. Edward Gœbel recommends the preparation of a 10 per cent. hydrobromic acid, as follows: 148 grains of bromide of barium (prepared as below) are dissolved in half an ounce of distilled water; to this solution 50.6 grains of sulphuric acid, "U. S. P.," diluted with about 2 drachms of distilled water, is added, the whole thrown on a filter, and the sulphate of barium on the filter washed with sufficient water to make the filtrate weigh 810 grains. By careful evaporation the 10 per cent. acid so obtained may be concentrated so as to represent 30 per cent., or even more, of hydrobromic acid. The

Bromide of barium for the above process may be made as follows: Triturate together 100 parts of *pure* carbonate of barium and 95 parts of bromide of ammonium with sufficient distilled water to make a damp powder. Heat this mixture in an evaporating-dish or a crucible, at first moderately, and gradually increase the heat, stirring frequently. Continue the heat as long as carbonate of ammonium is evolved, then allow to cool, dissolve in water, filter, and evaporate the solution to dryness. The carbonate of barium used in this process should be carefully freed from chlorides by washing with water.—New Rem., September, 1880, p. 262.

IODINE.

Iodine—Dialysis in the Manufacture.—Iodine manufacturers cannot get regular supplies of seaweed for their ovens, but find themselves compelled at times to buy far more than they can dry or carbonize before fermentation sets in. The liquid which drains from the fermenting heaps contains much iodine, with a large proportion of organic substances. Hitherto this liquid has been run into the carbonizing ovens and reduced to ash with the seaweed. But J. Tellieux and E. Allary have adopted a new plan, which consists in concentrating the liquid by the waste heat of the retorts, and running it into Dubrunfaut's dialysors. A solution of crystalloids is thus obtained, from which iodine can be made without incineration. By this method 9 kilos of iodine are obtained from each cubic meter of raw juice against 1.3 kilo obtained by the old incineration method.—Chem. and Drug., February, 1881, 1882; from Bull. Soc. de Pharm. de Paris.

FLUORINE.

Hydrofluosilicic Acid—Formation of Crystals.—Mr. M. Kessler, in order to prepare a concentrated solution of hydrofluosilicic acid, passed fluoride of silicon into hydrofluoric acid. The process was successful, and it was found that when the hydrofluoric acid was concentrated there was no deposition of silica, or absorption of excess of gas. In operating in this manner, the tube through which the fluoride of silicon passed and the recipient became filled with needle-shaped crystals, which, on examination, proved to be a definite hydrate of hydrofluosilicic acid. They were free from hydrofluoric acid, for their aqueous solution after precipitation by excess of chloride of potassium did not corrode glass; neither did they contain excess of fluoride of silicon, for the silicofluoride of potassium so formed, after having been washed with dilute alcohol, left behind no trace of silica in the evaporated washing waters. The crystallized acid is colorless, very hard, and very deliquescent; it fumes strongly in the air, and melts at about 19°. Heated beyond this point it boils, but decomposes at the same time. Its composition appears to be $SiF_4.2HF, + 2H_2O$.—Jour. Chem. Soc., November, 1880, p. 789; from Compt. Rend., 90, pp. 1285–1286.

PHOSPHORUS.

Phosphorus—Solubility in Alcohol.—Mr. Schacht has made some experiments from which he concludes that phosphorus is capable of being held in solution by cold alcohol (nearly absolute, specific gravity .798 at 60° F.) to the extent of 1 grain to 1 ounce, but that about one-fourth of the phosphorus will be found to exist in the solution as one of its acid oxides. If the solution is conducted in a close vessel so as to prevent the access of air, the quantity of phosphorus named disappears but slowly, and its complete solution requires about four hours and frequent shaking at a constant temperature of 160° F. But if the vessel has two or three times the capacity of the contents (*i. e.*, if air is present) the phosphorus disappears in about twenty minutes, if the same temperature is maintained. Both solutions are acid, but the last named much more so than the first, in which only $\frac{1}{10}$th grain of phosphorus had become converted into acid.—Drug. Circ., February, 1881, p. 18.

Pure Phosphoric Acid—Preparation.—According to A. Ditte, pure phosphoric acid may be easily obtained by saturating a solution of phosphate of sodium with hydrochloric acid gas, decanting the clear liquid from the precipitated common salt, and distilling off the excess of hydrochloric acid.—Am. Jour. Phar., November, 1880, p. 546; from Compt. Rend., 90, p. 1163.

Phosphoric Acid—New Process.—The natural phosphates, unground, are dissolved in dilute hydrochloric acid, and when the acid has ceased to act, the clear solution is decanted and mixed with enough sulphuric acid to saturate all the dissolved lime, leaving a mixture of hydrochloric and phosphoric acid and sulphate of lime. This mixture is filtered to separate the latter, and the acids are then concentrated, and the hydrochloric acid condensed and collected for use by means of ordinary columns.—New Rem., March, 1881, p. 84; from "Science."

Dilute Phosphoric Acid—Preparation.—Mr. Robert O. Lehn, referring to the deposit observed by Mr. P. C. Jensen in dilute phosphoric acid prepared from commercial glacial acid (see Proceedings, 1880, p. 228), attributes it to the presence of phosphate of calcium in the latter, and to organic matter in the water used in the preparation of the specimens examined. He recommends the following process for its preparation as being less dangerous than that of the Pharmacopœia or of Professor Markoe: Take of cleaned phosphorus, 360 grains; nitric acid, 5 troy ounces; iodine, 2 grains; water, q. s. Mix and set aside until the phosphorus is dissolved; then evaporate to 2 ounces, or until all nitrous vapor is expelled, dilute to 20 fluid ounces, and filter. The phosphorus may be cleansed by immersing it in a weak solution of chromic acid.—New Rem., July, 1880, p. 194.

Dilute Phosphoric Acid—Modification of Officinal Process.—Mr. J. U. Lloyd draws attention to certain objections in the manipulation directed in the officinal process. The use of a funnel and dish should be dispensed with, and a glass retort substituted. After the introduction of the phosphorus, acid, and water into this, the air is to be displaced by carbonic acid, thereby avoiding the loss of a small quantity of phosphorus by combustion at the commencement of the operation. The neck of the retort is attached to a condenser, and the source of heat is an expanded steam or water-bath, which gives sufficient heat to complete the reaction. If amorphous phosphorus is substituted for ordinary phosphorus the operation may be conducted in an open dish without danger. The evaporation of the solution of phosphoric acid to a small bulk, in order to drive off the excess of nitric acid, is also objected to by the author. The high heat necessary to effect this is often sufficient to produce both meta and pyrophosphoric acids. To overcome this he recommends the concentration of the solution of phosphoric acid (by distillation so as to save the nitric acid) to 8 parts from 3 parts of phosphorus, then to add an equal weight of pure alcohol, and to distil this mixture so as to remove the nitric acid as nitrous ether. In case the alcohol employed is not entirely pure, the acid becomes more or less colored during this operation; in which event it is digested with a little purified animal charcoal (¼ part to 3 parts P.) for an hour, and filtered through a plug of cotton placed in the exit of a funnel. The author gives working formulas for preparing the acid from ordinary as well as from amorphous phosphorus.—Ibid., pp. 194–196.

Phosphates—Industrial Preparation from Iron Slags.—In the newly devised process of Mr. Sidney Gilchrist Thomas, for dephosphorizing iron ores, the elimination of phosphorus from the cast iron is effected by lining the furnaces with a very basic fire-brick, rich in magnesia.

Mr. Thomas has just patented in England a process for recovering from the slags all the phosphate formed. The slags are broken up and treated with hydrochloric acid. The filtered solution is then evaporated and the residue calcined at low temperature to drive out the adhering hydrochloric acid, without decomposing, however, the ferric or manganous chloride. The chlorides of iron, manganese, and lime are then washed out with water, and the residue forms a concentrated basic phosphate.—Am. Jour. Pharm., August, 1880, p. 399; from Ber. d. Deutsch. Chem. Ges., xiii, p. 1150.

Dicalcium Phosphate—Characters.—A. Millot finds that dicalcium phosphate, dried at 100°, contains $5H_2O$, which it does not lose below 115°, and that in this condition of hydration it is soluble in ammoniacal citrate of ammonium, whilst the phosphate containing 1 mol. of water is only sparingly soluble in such. It is partially decomposed when boiled with water, phosphate of calcium goes into solution, and tricalcium phosphate is formed.—Jour. Chem. Soc., July, 1880, p. 442; from Bull. Soc. Chim. (2), 33, pp. 194–198.

BORON.

Boron—Position in the List of Elements.—A. Etard proposes to place boron at the head of the vanadium family of elements, forming a group intermediate between that of phosphorus and carbon. This juxtaposition of boron to the phosphorus group is supported by the existence of the compound BCl_3 and $BOCl_3$ recently (1879) discovered by Councler, and by the existence of boric triethide, or triethylborine, which is analogous to triethylphosphine in composition and properties. The relations of vanadium to the phosphorus group have been established by Roscoe, and the labors of Deville and Troost have done as much for niobium and tantalum.—Am. Jour. Phar., April, 1881, p. 170; from Comptes Rendus, 91, pp. 627–629.

CARBON.

Bisulphide of Carbon—Solid Preparation for Vines.—J. Lafaurie prepares, for use against phylloxera, a solid resulting from the intimate mixture at 35° or 40° of bisulphide of carbon with a solution of certain algæ, preferably of *Japan moss.* The amount of bisulphide in the preparation may be as much as 80 per cent., and the evaporation is very slow, a large quantity of bisulphide having been found in a piece that had been exposed to the air for two months.—Jour. Chem. Soc., June, 1881, p. 482; from Compt. Rend., 91, p. 964.

CYANOGEN.

Alkaline Cyanides—New Method of Production.—Victor Adler, starting out with the cyanide formation in the Leblanc process, finds as the result of his studies that the cyanides of the alkali metals as well as of the alkaline earths are formed when: 1. Their oxides, hydrates, or carbonates are ignited with charcoal in a nitrogen atmosphere, in which case an addition of finely divided iron is especially helpful. 2. When the sulphates or sulphides, mixed with carbonate of calcium and charcoal, are ignited in a nitrogen atmosphere, either with or without the addition of iron. 3. When the sulphates or sulphides, mixed with charcoal and a metal which has when heated a strong affinity for sulphur, such as iron, zinc, copper, are ignited in a nitrogen atmosphere. 4. When the sulphides of the alkaline earths are changed into oxides or carbonates by ignition with hydrocarbons, and then treated as under 1. He proposes the following process: Wood charcoal, coke, sawdust, etc., are saturated with a solution of the alkaline or alkalini-earth salts. Or pulverized charcoal is saturated with the solution and a mass is then made up with sawdust or half-charred wood. The iron is incorporated as metallic powder, or the charcoal having been saturated with ferric chloride or sulphate solution, is dried and ignited in a current of steam. The materials, so prepared, are ignited in retorts into which nitrogen gas is conducted. This nitrogen gas is prepared by passing atmospheric air through a series of tubes in which it gives up its oxygen to alkaline liquids, such as sulphide of barium, solutions of which saturate various porous materials. The process is patented in Germany.—Am. Jour. Phar., June, 1881, p. 293; from Chem. Indus., April, 1881, p. 117.

Cyanide of Potassium—Action of Permanganate of Potassium.—E. Baudimont has found that when a solution of cyanide of potassium is alkaline, the result of the reaction of permanganate of potassium upon it is an abundance of nitrous fumes and relatively little urea; if some acid (sulphuric), however, is added, urea is formed in abundance, and with it carbonic, nitric, formic, and oxalic acids.—Am. Jour. Phar., July, 1880, p. 366; from Compt. Rend., pp. 89, 1115.

Ferrocyanide of Sodium—Direct Preparation.—S. Tanatar has succeeded in preparing ferrocyanide of sodium by melting together chloride of sodium, carbonate of sodium (or lime), animal charcoal (prepared by Trommsdorff from blood), and iron filings, and he finds that, under certain conditions, the yield is even larger than when potash is used. Hitherto potash alone has been regarded as capable of generating cyanogen. The author, furthermore, is led to the view that the formation of free alkali-metal is not a necessary condition to the formation of cyanogen, the generally accepted views to the contrary notwithstanding. His experiments, briefly stated, were as follows:

Ten grams of animal charcoal gave as the average of three to five experiments:

1.	Melted with	25 grams	K_2CO_3, ...	2.15	grams	ferrocyanide.
2.	"	"	Carbon. of sodium and potas , . . .	1.87	"	"
3.	"	"	KCl and 5 g. K_2CO_3, .	1.72	"	"
4.	"	"	NaCl and 5 g. K_2CO_3, .	1.81	"	"
5.	"	"	KCl, ...	0.4	"	"
6.	"	"	KCl and 5 g. Na_2CO_3, .	1.6	"	"
7.	"	"	KCl and 5 g. $CaCO_3$, .	1.2	"	"
8.	"	"	KCl and 5 g. Na_2CO_3, and 3 g. $CaCO_3$, .	2.0	"	"
9.	"	"	Na_2CO_3, . . .	0.2	"	"
10.	"	"	NaCl, ...	0.2	"	"
11.	"	"	NaCl and 5 g. $CaCO_3$, .	1.22	"	"
12.	"	"	NaCl and 5 g. Na_2CO_3,	2.17	"	"
13.	"	"	NaCl, 5 g. Na_2CO_3, and 3 g. $CaCO_3$, . .	2.30	"	"

In each of these experiments 10 to 15 per cent. of cast-iron filings were added to the mixture, together with various nitrogenous materials. In a larger experiment, carried out with one kilogram of woollen goods and potash on the one hand, and with the mixtures Nos. 12 and 13 on the other, the result was in favor of the sodium compound. The difficulty that presents itself to the industrial application of the author's observation, is the separation of the sodium compound from the melt by the method of crystallization, which, as is well known, is readily accomplished in the case of the potash compound.—Phar. Centralh., August 12th, 1880, p. 279; from Dingl. Jour., pp. 234, 237.

Ferricyanide of Potassium—Easy Preparation.—The following easy method for converting ferro into ferricyanide of potassium is given in "Polyt. Notizbl.:" Heat a solution of ferrocyanide of potassium, made strongly alkaline, for several hours with a corresponding quantity of peroxide of lead to boiling, filter, and evaporate the dark-colored liquid so that it may crystallize.—New Rem., August, 1880, p. 231.

Ferricyanide of Potassium—Preparation.—K. Seuberlich has tested the conditions under which ferrocyanide of potassium is changed by the action of peroxide of lead in alkaline solution into the ferricyanide. His results agree with those previously obtained by Lunge. The change succeeds perfectly in the cold when the solution of ferrocyanide is treated with peroxide of lead, and then a slight excess of dilute hydrochloric acid is added with constant stirring. When red lead is used, higher temperatures and larger excess of acid are necessary. The change can also be effected by peroxide of manganese, even in the cold. In the latter case, however, the solution filters with difficulty.—Am. Jour. Phar., May, 1881, p. 233; from Dingl. Polyt. Jour., pp. 238, 484.

Prussian Blue—Formation of Crystals.—Mr. W. Gintl states, that if recently precipitated Prussian blue is treated with a moderate excess of hydrochloric acid at a gentle heat, it dissolves to a yellowish liquid, which, on exposure to the air, gradually deposits Prussian blue as a crystalline sediment, displaying a splendid coppery lustre by reflected light. So-called Turnbull's blue dissolves in hydrochloric acid in the same manner as ordinary Prussian blue, and yields similar crystals, a further evidence of the identity of the two compounds.—New Rem., February, 1881, p. 51; from Chem. Centralbl., No. 23.

POTASSIUM.

Potashes—New Method of Manufacture.—E. Engel converts chloride of potassium, the abundant product of the Stassfurt salt deposit, into carbonate as follows: Magnesia or carbonate of magnesium is added to the aqueous solution of chloride of potassium, and the mixture is treated with carbonic acid gas. Bicarbonate of magnesium is first formed, this dissolves and then reacts with the chloride of potassium to form chloride of magnesium and a crystalline double salt ($MgCO_3$, $KHCO_3$) which separates out. By simply heating this with water, carbonic acid escapes, carbonate of magnesium is formed, and carbonate of potassium remains in solution. A portion of chloride of potassium escapes decomposition, but is utilized otherwise.—Am. Jour. Phar., June, 1881, p. 293; from Compt. Rend., 92, p. 725.

SODIUM.

Sodium and Potassium Salts—Solubility in Water.—Mr. John Francis Loehle has determined the solubility in water, at 60° and 80° F. respectively, of a large number of sodium and potassium salts of fair commercial quality.—Am. Jour. Pharm., June, 1881, p. 285.

Rock-Salt—Analysis.—According to B. E. Sloan, the rock-salt of Saltville, Virginia, has the following composition: NaCl, 89.21; KCl, trace; $CaSO_4 2H_2O$, 4.86; Fe_2O_3, 0.84; SiO_2, 4.53. Strontium, barium, and lithium were absent.—Am. Jour. Pharm., August, 1880, p. 398; from Chem. News, vol. xl, p. 187.

Chemically Pure Soda—Preparation.—According to an observation of Gerresheim, any chlorine or sulphuric acid which may be present in a soda solution is completely removed by shaking up the solution with Millon's base,—the product obtained by the action of ammonia on mercuric oxide. Endeman and Prochazka propose to utilize this reaction for the preparation of chemically pure soda. For this purpose, they shake up some 2 liters of soda solution with 30 grams of the base once or twice daily for a week. As the free ammonia cannot be completely removed from Millon's base by washing, it is neutralized by adding mercuric oxide to the soda solution.—Am. Jour. Phar., November, 1880, p. 545; from Chem. Industrie, III, p. 273.

Soda—Manufacture from Sulphate by means of Lime and Sulphur.—F. Gutzkow has patented (in Germany?) a method for preparing caustic soda from sodium sulphate by treating the latter with calcium sulphite and introducing sulphurous acid gas into the mixture. Soluble calcium bisulphite is thus formed, which reacts with the sodium sulphate, forming calcium sulphate and sodium bisulphite. These are separated by filtration, and the gypsum washed out with hot water. The sodium bisulphite is then treated with milk of lime, whereby a solution of caustic soda is obtained, which contains a certain proportion of sodium sulphite and sulphate, and also calcium sulphite. It is evaporated in the usual manner, and the calcium sulphite which is left after decantation is used in another operation. Details of the apparatus used and the mode of working are given.—Pharm. Jour. and Trans., September 25th, 1880, p. 256; from Jour. Chem. Soc. (August, 1880), and Dingl. Polyt. Jour., 236, pp. 148–158.

Sodium Sulphate—Decomposition by Carbonate of Barium and Caustic Lime.—Hill found that when sulphate of sodium was boiled with an equivalent of carbonate of barium and lime under pressure, the sulphate was converted completely into caustic soda. Wartha has shown that the decomposition goes on in open vessels, and Lunge has now confirmed Wartha's observation. Both freshly precipitated carbonate and witherite were used; but in the latter case complete decomposition only resulted after a second addition of witherite. Mr. Lunge also attempted the *decomposition of sulphate of sodium by lime* alone, the influence of various pressures, temperatures, and admixtures of water and lime being examined. Sealed tubes were employed, and the pressure roughly estimated from the temperature. Only in one case was a pressure above 5 atmospheres obtained. The best result was obtained at a temperature of 150°–175°, pressure 5–8.5 atmospheres; 1 part sulphate, 1 part lime, and 25 parts water gave 31.7 per cent. of the sulphate converted into the hydrate. The decomposition is so imperfect that the process cannot be applied practically. On the other hand 1 equivalent of

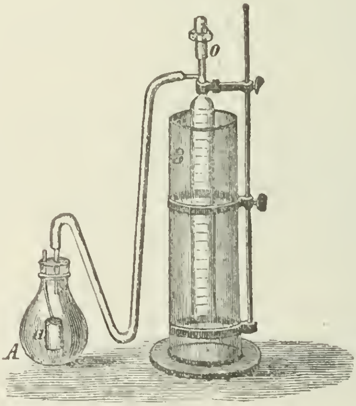
Sodium nitrate heated with 2.5 equivalents of carbonate of calcium in a platinum boat placed in a porcelain tube, was completely converted into caustic soda, while the greater part of the nitric acid can apparently be recovered. This appears to be a good process, if only suitable apparatus can be obtained. The boat was strongly attacked, as were also vessels of glass, porcelain, and wrought iron used in parallel experiments.—Jour. Chem. Soc., May, 1881, p. 322; from Dingl. Polyt. Jour., 238, p. 69–77.

Bicarbonate of Sodium—New Impurity.—S. Koster subjected some "English" bicarbonate of sodium to the test of the Phar. Germ., and obtained results which corresponded with the requirements of that standard. On nearer examination, however, he detected the presence of bicarbonate of ammonium, which was quantitatively determined to amount to 3.98 per cent. The presence of this compound is accounted for by the method now frequently employed by manufacturers. The ammonia liquor of the gas-works is saturated with common salt, and carbonic acid is introduced under pressure. Muriate of ammonium and bicarbonate of sodium are thus formed, the latter separating. If, however, ammonia is employed in excess, bicarbonate of ammonia also forms, and this, being also sparingly soluble, separates with the bicarbonate of sodium, and is not removed by the washing process to which the latter is subjected.—Arch. d. Pharm., July, 1880, pp. 31–33.

AMMONIUM.

Ammonia—Determination in Gas-liquor.—The direct titration of the ammoniacal gas-liquor, by which only the free and the carbonated ammonia is determined, generally yields figures which are too low, while its previous distillation with lime usually produces the opposite result, owing to the fact that some cyanogen present is decomposed and partly converted into ammonia which is titrated with the other. W. Foster uses the apparatus illustrated in the cut (Fig. 88) for making such determinations, with exclusion of the above errors by means of hypobromite of sodium: $2NH_3 + 3NaBrO = N_2 + 3NaBr + 3H_2O$. 1 gram of bromine is added to solution of 1 gram of soda in 10 cc. of water, the whole shaken and then transferred to the flask *A*. The

FIG. 88.



Apparatus for Ammonia Determination.

ammoniacal liquid to be assayed is contained in the smaller glass vessel *a*. The measuring cylinder *B* is then dipped into the water contained in the reservoir *B* to such a depth that the water inside and outside stands at zero, when the pinchcock *O* is closed, and, provided the apparatus is perfectly air-tight, the contents of the small vessel *a* gradually and in small portions mixes with the reagent. When the reaction is over, the flask *A* is gently warmed to drive out all nitrogen. After the apparatus has again cooled to the usual temperature, the volume of the eliminated nitrogen is read off. In calculating the results for ammonia, an addition of 4 per cent must be made as a correction.—From Die Chem. Industrie, 1880, p. 287; in New Rem., December, 1880, p. 355.

MAGNESIUM.

Carbonate of Magnesium—Commercial Quality.—R. Otto and G. Gabler have made comparative analyses of various kinds of commercial carbonate of magnesium, and have found that the English carbonates, as well as two German kinds, are less pure than that made at Nauheim, Germany. The latter contains a trace of chlorine more than the English products, which approach it otherwise nearest in purity, but it contains a much smaller quantity of lime and is almost entirely free from sulphuric acid. The most impure, and for medical purposes entirely unfit carbonate, is that manufactured at Oeynhausen, Prussia (District of Minden). The process of manufacture followed at Nauheim is that first used by J. Pattison, of Washington (Durham, England). It depends upon the fact that, on treating calcined dolomite, in the presence of water, with carbonic acid under pressure, the magnesia dissolves as bicarbonate before any of the accompanying lime enters in solution. The calcined and finely powdered mineral is introduced, together with water, into a cylinder with horizontal axis, and, while it is being kept in constant motion by a stirring apparatus, carbonic acid gas, under a pressure of five to six atmospheres, is pressed into it. The resulting solution of bicarbonate of magnesium, which is perfectly free from lime, if the process was properly managed, is then transferred to a vertical cylinder, where it is heated with steam, whereby carbonate of magnesium is separated, which is collected, formed into prismatic pieces, and dried. The carbonic acid gas required issues from the earth immediately outside of the factory; and the dolomite is furnished by the quarries of May and Urban, near Dietz and Steelen on the Lahn.—From Arch. d. Pharm., August, 1880, p. 96; in New Rem., February, 1881, p. 52.

Powdered French Chalk—Pharmaceutic Uses.—Mr. R. F. Fairthorne finds powdered French chalk very useful in many parmaceutical manipulations. He draws particular attention to its usefulness in connection with the operation of compressing pills, and when making suppositories by hand. In the first case the die should be dipped into the French chalk before compressing the pill, whereby the pill formed is prevented from sticking; in the second case, a little of the powder is to be dusted on the hands, thereby preventing the plastic cacao butter-suppository mass from sticking to them during the rolling out and shaping.—Am. Jour. Phar., May, 1880, p. 245.

ALUMINIUM.

Aluminium Hydrate—Isomeric Modification.—D. Tommasi has observed that when ordinary aluminium hydrate, precipitated by ammonia from a solution of alum, is allowed to stand with water for about three months, it undergoes a molecular change. It is only very sparingly soluble in acids and alkalies, and is insoluble in acetic acid. It has the same formula as the normal hydrate, but it does not combine with aluminous chloride to form an oxychloride. The author proposes to call it aluminous hydrate δ to distinguish it from the normal hydrate α, gibbsite β, and the colloid hydrate of Graham, γ.—Jour. Chem. Soc., December, 1880, p. 849; from Compt. Rend., 91, p. 231.

Alums—Crystallization.—Alfred Polis examined the conditions for obtaining cubic alum and its behavior with other alums as regards overgrowth. The best results are obtained by dissolving 250 grams alum in 800 cc. water at 25° to 30°, adding 45 grams sodium carbonate, and exposing the clear solution to spontaneous evaporation. Ten of the crystals first formed were suspended in the liquid, and after seventy-four to ninety-two days they had become pure, shining, permanent cubes. On suspending such cubic alum in a solution of potash-chrome alum, the crystal increased as a cube, appearing to be a cubic chrome alum crystal, but displaying small, subordinate octahedron surfaces.—Ber. Deutsch. Ch. Ges. and Chem. News, August, 27th; in New Rem., February, 1881, p. 50.

New Sulphate of Aluminium—Formation and Characters.—According to P. Marguerite, when ammonium alum is decomposed by heat, anhydrous sulphate of aluminium is first obtained; by pushing the decomposition somewhat farther, sulphuric acid is volatilized, so that by carefully regulating the heat, a residue can be finally obtained almost entirely soluble in water, and consisting mainly of the *sesquibasic* sulphate. This salt, which has not been before described, is entirely different in appearance from the ordinary sulphate. It crystallizes in rhombohedrons and not in nacreous scales; its solubility in water at 15° is about 45 per cent. From the analysis the formula $Al_2O_3,2SO_3,12H_2O$, is deduced.—Jour. Chem. Soc., November, 1880, p. 792; from Compt. Rend., 90, pp. 1354–1357.

Aluminium Phosphate—Properties.—L. L. de Koninck and Thiriart observe that phosphate of aluminium is completely soluble in ammonium hydrate, in the presence of excess of phosphoric acid or of alkaline phosphates; hence in such cases on addition of ammonia the precipitate which forms at first rapidly disappears. From such a solution, however, acetic acid reprecipitates the phosphate of aluminium. —Jour. Chem. Soc., June, 1881, p. 465; from Zeitschr. Anal. Chem., 1881, pp. 90–91.

CERIUM AND ALLIED METALS.

Cerium—Presence of Didymium in the Oxalate.—Mr. Chastaing has found didymium to be a component of commercial oxalate of cerium. The presence of this metal is revealed by the dark brick-red color of the oxide obtained when the oxalate is subjected to calcination. Pure oxide of cerium is lemon-yellow while hot, pale yellow when cold. The author expresses the opinion that no pure cerium products are found in commerce.—Drug. Circ., May, 1881, p. 69.

Ytterbium and Scandium—Determination of Atomic Weight, etc.—Mr. Wilson, who discovered scandium, has obtained both of the oxides of these metals free from other earths, and has determined their atomic weight. That of *ytterbium* is 173.01. Its oxide, *ytterbia*, Yb_2O_3, is a white, very heavy, and infusible powder, which is slowly attacked by acids in the cold or at a gentle heat; at a boiling temperature, however, it is readily dissolved by dilute acids. Its solutions are colorless and show no absorption spectrum. Its specific gravity is 9.175. Its solutions have a very sweet and yet astringent taste. It gives no flame coloration, but the spark spectrum of its chloride contains a large number of characteristic lines. The atomic weight of *scandium* is 44.03. *Scandia*, Sc_2O_3, is a white loose powder, infusible, and possessing much similarity to glucina or magnesia. Its specific gravity is 3.864. It does not impart any color to the flame, although the spark spectrum of its chloride is particularly fine, containing more than one hundred bright lines. A number of its salts have been prepared, and are described by the author in "Ber. d. Deutsch. Chem. Ges.," xiii, pp. 1430–1439.—Am. Jour. Phar., October, 1880, p. 493.

Thulium and Holium—Further Characters.—Cleve has studied the *thulia* extracted from the mixture of rare earths, sufficiently to describe it more fully. Both the oxides and its salts are uncolored, like those of ytterbium, but its solutions show in the spectroscope two absorption rays, which do not appear in the spectrum of pure erbia. The atomic weight of *thulium* is approximately 170.7 if we accept for the oxide the formula Tm_2O_3.

Soret has studied and figured the spectra of several rare earths of the yttria group. Besides erbium, he identifies the earth first noted by himself, under the designation X (see "Proceedings," 1880. p. 258), and afterwards independently by Cleve, and named by him *holium*, which name Soret now accepts; also an earth designated as YB by Marignac, and independently discovered by Lecoq de Boisbaudran, and named by him samarium; and, lastly, didymium.—Am. Jour. Phar., October, 1880, p. 494; from Comptes Rendus, No. 91, pp. 328, 378.

FERRUM.

Reduced Iron—Examination.—O. Milner has made a large number of experiments, from which he draws the following conclusions:

1. The amount of metallic iron in reduced iron can be accurately determined by treatment with mercuric chloride and titration with permanganate of potassium.
2. If metallic iron is treated by the aid of a gentle heat with an excess of a concentrated solution of mercuric chloride, mercurous chloride and metallic mercury are separated, and the metallic iron passes as ferrous chloride into solution; the ferrous and ferric oxides which may be present remain undissolved, and therefore do not prevent the estimation of the amount of metallic iron in the reduction.
3. The amount of ferrous oxide in the preparation may be estimated by treating the same portion with hydrochloric acid, digesting the mixture in a closed vessel until the finely divided ferrous oxide becomes dissolved, and titrating with permanganate of potassium.
4. The ferric chloride which is thus formed at the same time has no appreciable action upon the precipitated metallic mercury and mercurous chloride.
5. The general acceptance of the opinion of Flückiger that reduced iron is a mixture of metallic iron with ferroso-ferric oxide, and upon which a method for the estimation of the amount of metallic iron is based, by its conversion into oxide and weighing the latter, is considered by the author as incorrect, the preparation being assumed to be rather a mixture of metallic iron with ferrous and ferric oxides in varying proportions.—Am. Jour. Phar., January, 1881, p. 15, and Pharm. Ztg., 1880, p. 705; from Farmaceutisk Tidskrift, August, 1880, No. 15.

Ferrous Chloride.—Mr. William Gilmour reviews the various methods recommended for the preparation of this compound, none of which, however, give the proportions of acid, iron, and water to be used. The latter is by no means immaterial, since, if the acid is too strong, the reaction, though brisk at first, will soon slacken; if heat is now applied, the reaction will again go on, but will again cease after a time, and the whole will pass into a semi-solid condition, owing to the supersaturation of the liquid with ferrous chloride. If too dilute, the reaction will be unnecessarily slow, there is difficulty to tell when it is completed, and there is more danger of oxidation during subsequent treatment. After numerous experiments, the author recommends the proportion of 2 parts of water to 1 part of hydrochloric acid. Theoretically, the quantity of iron necessary for 230 grains of hydrochloric acid (“Br. Phar.”) is 56 grains; but in practice a slight excess of iron should be used. The author's purpose is mainly to point out a proper method of procedure in making a syrup and pills of protochloride of iron, formulas for which he gives, and will be found under their proper headings in this report.—Chem. and Drug., June, 1881, p. 250.

Ferrous Sulphate—Properties and Preservation.—It is generally recommended that ferrous sulphate shall be kept in well-closed bottles so as to protect it from the action of the air. Mr. E. Johansen now finds, to the contrary, that such treatment is rather injurious, and that less ferric oxide is formed when the salt is exposed to air. He attributes this to the formation of ozone, and proves its presence by fastening a strip of iodide of potassium starch-paper into the cork closing a bottle partially filled with ferrous sulphate. After a comparatively short time the paper becomes blued. Ferrous sulphate, in the author's opinion and experience, is best preserved in bottles which are simply tied over with paper.—Phar. Centralh., January 27th, 1881, p. 47.

Ferric Sulphates—Composition.—Mr. Spencer Umfreville Pickering has examined basic ferric sulphate with a view to ascertain whether the various basic sulphates heretofore announced by observers had any claim to be recognized as definite salts. We have not space to describe in detail his elaborate and minute experiments, in which nothing was overlooked which would have yielded positive proofs of the existence of these bodies, if they had been definite compounds. But in every case, except *one*, only negative results were obtained.

There are fifteen ferric sulphates, besides the normal salt, so far recorded in chemical literature, namely:

1. $Fe_2O_3.7SO_3$
2. $2Fe_2O_3\ 7SO_3$
3. $2Fe_2O_3.5SO_3$
4. $3Fe_2O_3.7SO_3$
5. $Fe_2O_3.2SO_3$
6. $3Fe_2O_3.5SO_3$
7. $2Fe_2O_3.3SO_3$
8. $3Fe_2O_3.4SO_3$
9. $Fe_2O_3.\ SO_3$
10. $4Fe_2O_3.3SO_3$
11. $2Fe_2O_3.\ SO_3$
12. $3Fe_2O_3.\ SO_3$
13. $4Fe_2O_3.\ SO_3$
14. $6Fe_2O_3.\ SO_3$
15. $7Fe_2O_3.\ SO_3$

The percentage of ferric oxide contained in these bodies varies between 22.22 and 93.33.

The author finds that the only basic salt of definite and constant composition is No. 11 : 2 $Fe_2O_3.SO_3$. As a starting-point, the author prepared a large quantity of the normal ferric salt, $Fe_2O_33SO_3$, as follows:

Ferrous sulphate is oxidized in the usual manner by means of nitric acid; the ferric salt thus obtained, after being dried and powdered, is heated in an iron dish, in small quantities at a time, until it assumes a light-brown color while hot, becoming pink on cooling, which pink color is due to the presence of free ferric oxide. And, in order that the product may be obtained in form of an impalpable powder and easily dissolved by water, the dry powdered salt, still containing a small excess of sulphuric acid, should be heated as suddenly as possible to a temperature little short of redness, whereby the excess of sulphuric acid is driven off, and a portion of the remaining salt is decomposed. The impalpable powder thus obtained is mixed with about four times its weight of water, on which, if the quantities used are large, the heat developed is sufficient to effect its perfect solution; whereas, if small quantities are operated on, the heat at first evolved is quickly dissipated, and the solution does not become complete till after many days.

The 20 per cent. solution thus obtained was found, after filtration, to have a density of 1.208 at 15° C., and it contained a salt corresponding exactly to the formula $Fe_2O_3.3SO_3$ or Fe_23SO_4, being therefore the normal ferric sulphate.

By following the processes suggested by other experimenters, and by using every possible modification which could be thought of, and carefully analyzing the resulting products, the author invariably obtained a basic salt of uniform composition, and answering to the composition of $2Fe_2O_3.SO_3$.—From Journ. of Chem. Soc., December, 1880, p. 807; in New Rem., June, 1881, p. 182.

NICKEL.

Malleable Nickel—Preparation.—J. Garnier, experimenting to overcome the brittleness of nickel, caused by the presence of oxygen, unexpectedly found phosphorus to answer well. It appears to act with nickel in a manner analogous to the action of carbon in iron. If phosphorus, to the amount of 1 in 3000, be added to the nickel, the metal becomes soft and very malleable; with larger additions of phosphorus, the hardness is developed at the expense of the malleability. It is conveniently added in the form of a phosphide of nickel, containing 6 per cent. of phosphorus, which compound is readily obtained by fusing a mixture of phosphate of calcium, silicic acid, carbon, and nickel. Not only is the nickel so treated with phosphorus malleable in itself, but its alloys with copper, zinc, or iron are malleable and soft, while perfectly compact and free from gas bubbles.—Am. Jour. Phar., January, 1881, p. 17; from Comptes Rendus, pp. 91, 331.

Nickel-plating.—Mr. J. Kalmar draws attention to the insufficient nickel-coating upon many utensils. When the process is properly conducted, the coating should be as thick as ordinary writing-paper. To secure this, the ammonium-nickel chloride or sulphate answers very well, it being of paramount importance, however, that the bath should be neutral. Good results cannot be obtained either in acid or alkaline baths.—Phar. Centralh., July 8th, 1880, p. 245; from Metallarb. and Industriebl., No. 27.

URANIUM.

Uranium—Industrial Production.—C. Lallemand describes the production of uranate of sodium from the pitch blende of Joachimsthal. This ore, which is delivered to the works in powder, has a specific gravity of about 7., and contains from 40 to 55 per cent. of oxide of uranium (U_3O_4), with smaller amounts of vanadium, arsenic, sulphur, molybdenum, tungsten, cobalt, nickel, copper, bismuth, lead, silver, iron, manganese, lime, magnesia, alumina, and silica. It is first roasted in a calcining furnace, heated with lignite. The temperature of the furnace is raised very gradually, in order to drive off as much as possible of the sulphur, arsenic, and molybdenum without fritting the ore at all. At the end of eleven hours, when the temperature has been raised to dark red, the furnace is cooled a little, and a mixture of 4 per cent. of the weight of the charge of nitrate of soda and 15 per cent. of carbonate of soda is added. The roasting is continued after this addition for four hours more, the temperature being gradually raised to bright red. The roasted ore is then washed for a day with hot water, which removes the soda salts of molybdenum, vanadium, tungsten, arsenious acid, and sulphuric acid, while the uranium, iron, cobalt, nickel, copper, and silver remain in the residue. This residue is next treated with sulphuric and a little nitric acid, diluted with hot water. The solution contains uranium, with some other metals, while silica, sulphate of lime, sesquioxide of iron and of silver remain undissolved. An excess of carbonate of soda is now added to the clear liquid. This precipitates all the metals that it contains, except uranium. The filtered liquid is then boiled, by blowing in steam, to expel the dissolved carbonic acid, which retains in solution traces of oxide of iron and of carbonate of lime, and finally, after the removal of these, the uranate of soda is thrown down, either by adding caustic soda to the acidulated solution, to produce bright-yellow uranate ($NaO2U_2O_3 + 6HO$), or by exactly neutralizing the original alkaline solution by sulphuric acid to produce orange uranate ($NaO2U_2O_3$). The annual produce of uranium salts is now 4500 kilograms, and sells at about the rate of $5 per pound. Smaller quantities of oxide of uranium and of uranates of potash and ammonia are also made. *Vanadium* is extracted in small quantities from the liquor with which the roasted uranium ore has been washed, but the process is still too imperfect to be carried out by ordinary workmen.—Drug. Circ., February, 1881, p. 20; from The Textile Record and Annales des Mines.

CHROMIUM.

Chromium Sulphides and Selenides—Characters.—H. Moissan has studied the characters of sulphides and selenides of chromium.

Sesquisulphide of chromium (Cr_2S_3) is obtained as a brownish-black amorphous powder by passing dry sulphuretted hydrogen over heated, *but not calcined*, sesquioxide. It is but slightly attacked by acids, with the exception of nitric acid and aqua regia. When heated in chlorine gas, it is converted with incandescence into chromic chloride. On heating it in the air, the sesquioxide is formed; but if it be heated in a closed vessel, a portion of the sulphur is given off in the free state. By the action of sulphuretted hydrogen on chromic chloride, this compound is obtained in black brilliant plates, which retain the form of the chloride.

Monosulphide of Chromium (CrS).—This is obtained by heating the preceding compound in hydrogen. It is a black powder, attacked with difficulty by acids, but readily converted into chromic chloride by chlorine. When heated in the air, it is converted into the sesquioxide, but does not lose sulphur when heated in a closed vessel. By heating chromous chloride at 440° C. in sulphuretted hydrogen, the monosulphide is obtained as a grayish-black substance, retaining the micaceous appearance of the chloride.

Sesquiselenide of chromium (Cr_2Se_3) is a black powder, obtained by the action of selenuretted hydrogen on chromic chloride, or by heating the sesquioxide in selenium vapor. It is very slightly attacked by acids, and readily converted into a beautiful green-colored sesquioxide when heated in the air. Heated out of contact with air, it loses a portion of its selenium.

Monoselenide of chromium ($CrSe$) is obtained by heating the preceding compound in a current of hydrogen, or by the action of selenuretted hydrogen on chromous chloride. It is easily converted into the sesquioxide by ignition, and is readily attacked by chlorine.—Jour. Chem. Soc., August, 1880, p. 527; from Compt. Rend., pp. 90, 817–819.

Chromic Chloride—Formation of Permanently Green Crystals.—A. Meugeot observes, that when hydrochloric acid acts on bichromate of potassium in aqueous solution, chlorine is given off, and a dark blackish-brown solution is formed, which, by slow evaporation, deposits chromic chloride in large crystals of a deep violet color, also in small green crystals. These green crystals have remained unchanged for more than two years.—Jour. Chem. Soc., June, 1881, p. 352; from Compt. Rend., pp. 91, 389.

Barium Dichromate ($BaCr_2O_7$)—*Preparation and Characters.*—K. Preis and B. Rayman obtain this compound by dissolving neutral chromate of barium in concentrated chromic acid, and drying the crystalline product at 100° C. It is decomposed by water into chromic acid and ordinary chromate of potassium, a fact that explains the observation of Schulerud, that only monochromate of barium is obtained by precipitating barium solutions with dichromate of potassium. The mother liquor from the precipitate of barium dichromate, on standing, deposits crystals having the composition of the salt, $BaCr_2O_7 + 2H_2O$, obtained by Bahr and Zettnow in 1853.

Strontium dichromate ($SrCr_2O_7 + H_2O$), identical with the salt described by Bahr, was obtained like the barium salt. It consists of easily soluble crystals. A deliquescent salt containing $3H_2O$ was also obtained. The compounds $PbCr_2O_7$ and $PbCr_2O_7.2H_2O$ are also described.—Jour. Chem. Soc., July, 1880, p. 444; from Ber. der D. Chem. Ges., pp. 13, 340–343.

ZINCUM.

Chloride of Zinc—Use as a Reagent for Alkaloids, etc.—Mr. A. Jorissen finds that a number of bodies produce characteristic reaction with pure zinc chloride. His method of operating is as follows:

A solution of the alkaloid or its hydrochlorate is evaporated to dryness upon the water-bath, say in the inside of the lid of a porcelain crucible; two or three drops of the test solution—1 gm. fused zinc chloride in 30 cc. concentrated hydrochloric acid and 30 cc. water—are placed upon the residue, and dried afresh on the water-bath. The coloration begins on the outer edge, and spreads inward as the water is expelled.

Treated in this way, strychnia gives a bright rose; thebaine, yellow; narceine, olive-green; delphinine, brownish-red; berberine, yellow; veratrine, red; quinine, pale green; digitalin, chestnut-brown; salicin, violet-red; santonin, violet-blue; cubebin, carmine-red; albuminoid substances, if heated for some time with the zinc solution, leave a violet stain upon the porcelain, which may be distinguished by its instability from the colorations mentioned above.—New Rem., February, 1881, p. 34; from Zeitschr. f. Anal. Chem., 1880.

Sulphate of Zinc—Delicate Test for the Presence of Iron.—E. Mylius draws attention to the insufficiency of the test of the Ph. Germ.* for the presence of iron in sulphate of zinc. Even white sulphide of ammonium, unless added with care and particular manipulation (pouring an excess upon the surface of the liquid to be tested and inclining gently so as to cause slow admixture, when any iron present is evidenced in the upper portion of the liquid), is not sufficiently delicate. The smallest traces of iron are, however, detected if a small quantity of chlorine or bromine water is added to the solution of sulphate of zinc, followed by the addition of sulphocyanide of potassium or sodium. The coloration produced thereby in the presence of iron can not escape detection.—Phar. Centralh., December 23d, 1880, p. 468.

Permanganate of Zinc—Quality of the Commercial Article.—Dr. J. Biel draws attention to the commercial quality of this compound, which is usually found in form of solution. The solution, however, varies in strength, and though usually represented and demanded of a strength of 25 per cent., it very rarely reaches that, varying from 7.5 per cent. upwards. A solution containing 10 per cent. is strong enough for the purposes of the dispenser, and such should be furnished by the manufacturer and demanded by the dispenser. The dry salt cannot be recommended, since it is only partially soluble. A sample examined by Dr. Biel contained only 62.2 per cent. soluble permanganate of zinc. The best course, under existing conditions, is to determine the quantity of permanganate by means of ferrous sulphate or oxalic acid; the next best is to determine the specific gravity, which will show the percentage by the aid of the accompanying table.

Permanganate of Zinc.	Sp. gr.	Permanganate of Zinc.	Sp. gr.	Permanganate of Zinc.	Sp. gr.
1 per cent.	1.010	13 per cent.	1.133	25 per cent.	1.270
2 "	1.019	14 "	1.144	26 "	1.282
3 "	1.029	15 "	1.155	27 "	1.294
4 "	1.039	16 "	1.166	28 "	1.307
5 "	1.049	17 "	1.177	29 "	1.319
6 "	1.059	18 "	1.188	30 "	1.332
7 "	1.069	19 "	1.200	31 "	1.344
8 "	1.080	20 "	1.211	32 "	1.357
9 "	1.090	21 "	1.223	33 "	1.370
10 "	1.101	22 "	1.234	34 "	1.383
11 "	1.111	23 "	1.246	35 "	1.395
12 "	1.122	24 "	1.258	36 "	1.408

—Phar. Centralh., January 13th, 1881, p. 22; from Phar. Zeitschr. f. Russl.

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* The Germ. Phar. says of sulphate of zinc: Its aqueous solution, on the addition of water of ammonia, yields a precipitate which is entirely soluble in excess of the reagent, and should not be colored when treated with hydrosulphuric acid.—Rep.

CUPRUM.

Copper—Hydrobromic Acid a Delicate Reagent.—An aqueous solution of bromide of copper is blue; upon evaporation it becomes darker, changes to reddish-brown, and finally leaves the anhydrous bromide as a nearly black mass. Dr. H. Endemann and Dr. George A. Trochazka find that concentrated hydrobromic acid is capable of removing water from the copper bromide, and that, under proper conditions, it will produce characteristic color reactions, which are so sensitive as to indicate the presence of $\frac{1}{100}$th mgr. of copper. A drop of a solution containing copper is placed upon a watch-glass, a drop of conc. hydrobromic acid is added, and the mixture is allowed to evaporate slowly. When the liquids are reduced to one drop a rose-red color is developed, which is of much greater intensity than the color produced by ferrocyanide of potassium. The presence of iron interferes, but only when present in large quantities.—D. A. Apothek. Ztg., November 1st, 1880, p. 3.

BISMUTHUM.

Subnitrate of Bismuth—Method to Secure Freedom from Arsenic.—For the purpose of removing arsenic that may contaminate the metal, the Germ. Phar. directs the dilution of the acid solution of nitrate of bismuth with water until basic salt begins to precipitate, with which the arsenic, as arsenite of bismuth, will also precipitate. C. Schneider recommends the method of R. Schneider (see Proceedings, 1880, p. 246), which has the advantage over the above, in that the crude metal, irrespective of the quantity of arsenic it may contain, may be used. By the method of Schneider the arsenic is converted into arsenic acid and forms arsenate of bismuth, which is with difficulty soluble in nitric acid of specific gravity 1.2, and almost completely insoluble in a concentrated solution of nitrate of bismuth. Using 1700 parts of bismuth and 5000 parts of nitric acid (specific gravity 1.2), Mr. C. Schneider obtained 2500 parts nitrate, and from this 1220 parts of subnitrate of bismuth. From the residues he obtained a quantity of bismuthic oxide corresponding to 428 parts of metal.—Arch. d. Pharm., August, 1880, p. 109.

Subnitrate of Bismuth—Estimation of Nitric Acid.—Baudrimont has always found, in commercial subnitrate of bismuth, larger quantities of nitric acid than its formula demands. He determines the amount of nitric acid in the following manner: A standard acid is first prepared, containing in 1 liter 9.074 gm. of monohydrated sulphuric acid (of which 1 cc. corresponds to 0.01 gm. anhydrous nitric acid), and also a corresponding soda solution, containing 7.407 gm. of sodium hydrate per liter.

One gram of the subnitrate of bismuth to be examined is introduced into a flask, marked at the neck for a capacity of 100 cubic centimeters, 20 cc. of the soda solution are next added with 30 cc. of water, and the whole boiled for ten minutes. The flask is then rapidly cooled to 15° C. (= 59° F.) by immersion in cold water, filled up to the mark with water, and the liquid, after being uniformly mixed, filtered through a small filter. 50 cc. of the filtrate are introduced into a porcelain capsule, and, after the addition of solution of litmus, titrated with the sulphuric acid. The amount of nitric acid present is calculated from the number of cubic centimeters of sulphuric acid lacking from 50 cc.—Jour. de. Ph. et Ch.

The editor of the "Pharm. Zeitschr. f. Russland" correctly remarks that the above method is not new, but still deserves to be again noticed. He also adds that the oxide of bismuth should be collected upon a tared filter, then dried and weighed, so that if the quantity of acid present is found normal, it may be ascertained whether a portion of it has not been in combination with ammonia.—New Rem., March, 1881, p. 81.

Subnitrate of Bismuth—Contamination with Phosphate of Calcium.—Dr. Dioscoride Vitali reports having met with a subnitrate of bismuth containing phosphate of calcium. The excessive lightness of the bismuth salt made him suspicious of its purity, and the process by which he detected the adulteration is described by him as follows: A small quantity of the suspected salt was dissolved in just sufficient strong nitric acid, and to the solution was added a solution of molybdate of ammonium, which turned the liquid immediately yellow, and shortly produced a copious yellow precipitate. The subsequent addition of ammonia, in excess, caused the yellow color to disappear, and the precipitate became white. This preliminary test indicated the presence of considerable amounts of phosphoric acid. Another sample of the salt was then dissolved in dilute hydrochloric acid, the solution diluted with water as far as possible without producing a precipitate, and all the bismuth precipitated as sulphide by means of sulphuretted hydrogen. The filtrate was heated to expel the excess of the gas, and ammonia then added in excess, which caused a gelatinous precipitate. The liquid separated from the latter by filtration yielded a white precipitate with oxalate of ammonium, insoluble in acetic, but soluble in hydrochloric acid, being, therefore, oxalate of calcium. This part of the lime salt was evidently itself an impurity in the phosphate of calcium employed for adulteration, and was present, no doubt, as carbonate, since the suspected bismuth strongly effervesced with acids. The gelatinous precipitate was dissolved in nitric acid, and the solution boiled with pure powdered tin. The liquid was filtered from the whitish precipitate, and the filtrate yielded a copious precipitate with oxalate of ammonium, as before, being the remainder of the calcium as oxalate. The white precipitate caused by the tin was dissolved in warm hydrochloric acid, and to the solution was added molybdate of ammonium, which produced the characteristic yellow precipitate of phosphomolybdate of ammonium.—From Bolletino Farmaceutico (Milano), 1880, p. 295; in New Rem., March, 1881, p. 84.

Phosphate of Bismuth—Substitute for the Subnitrate.—Dr. Tedenat prefers the phosphate to the subnitrate of bismuth. The anti-diarrhœic effect of the phosphate is exercised in the same manner as that of the subnitrate, but it may be given in smaller doses (15–30 grains) as a general thing.—Chem. and Drug. April, 1881, p. 165; from Phila. Med. Times, and L'Union Pharm.

ARSENICUM.

Arsenic—Determination, Quantitatively and Qualitatively.—Professor Reichardt has applied the reaction of arsenuretted and antimonuretted hydrogen with silver salts—first noticed by Lassaigne—to the determination of arsenic. He finds it quite as sensitive as the method of Marsh, and free from some of the objections to the latter. The apparatus for the purpose is identical with that described by Ziegler for detecting arsenious and sulphurous acids in hydrochloric acid (which see, p. 247); the hydrogen, however, is generated with zinc and sulphuric acid, and the smaller vessels both contain solution of nitrate of silver (1 : 50), which must be strongly acidified with nitric acid, because both neutral and alkaline solutions of silver allow the arsenuretted and antimonuretted hydrogen to pass partially undecomposed. To insure the purity of the reagents the gas is allowed to pass through the apparatus for a short time. If there is no change observed in the silver solution, the liquid is introduced by a funnel-tube into the gas generator, whereupon, in the presence of arsenic or antimony, the silver solution is rapidly reduced—more or less strongly according to the quantity of the metals sought. The smallest quantities (0.0000014 gram, As_2O_3) of either arsenic or antimony may be recognized, the inner surface of the tube conducting the gas into the silver solution becoming distinctly brown in their presence.

Quantitatively the arsenic is determined as follows: The process having been continued until all the arsenuretted hydrogen has passed over, a point which is determined by the previously turbid silver solution becoming clear, the latter is treated with hydrochloric acid in excess, chlorate of potassium is added, and the mixture heated. The excess of silver is thus precipitated as chloride, and the arsenic is converted into As_2O_5. The chloride of silver is removed by filtration, the filtrate is supersaturated with ammonia, and the well-known magnesia mixture ($MgCl_2,H_4NCl + H_3N$), used for the determination of phosphoric acid, is then added, observing that it shall contain a large proportion of chloride of ammonium. The As_2O_5 is by this method precipitated as AsO_4MgNH_4; Sb_2O_5 remains in solution. Instead of hydrochloric acid and chlorate of potassium, bromine-water may be used. The bromine-water is added in excess, the mixture is shaken or stirred, and filtered. The filtrate, containing arsenic or antimonic acid, or both, is treated as above. The principal precaution to be observed in the quantitative analysis, is to allow the generation of the arsenuretted hydrogen to take place slowly; for if the generation is too rapid there is danger that a portion of the arsenic is precipitated upon the metallic zinc, and thus escape detection. Obviously the same precaution should be observed in the qualitative test.

The author concludes his paper with some directions and descriptions of the value of bromine as an oxidizing agent in this connection, and particularly for the removal of sulphur from the liquid to be tested. He also describes a bromine-water spritz bottle, which is constructed with an two-necked Woulf's bottle bearing the tubes of an ordinary spritz bottle, which are, however, provided with stop-cocks. By its aid, bromine-water may be handled with comparative ease.—Arch. f. Phar., July, 1880, p. 1–23; Phar. Centralh., August 26th, 1881, p. 306.

Mr. F. W. Fletcher applies the nitrate of silver method to the gravimetric determination of arsenic in minute quantities. When it is borne in mind that 75 parts of arsenicum, as AsH_3, will throw down no less than 648 parts of silver, the delicacy of the reactions, and the possibility of determining so small a quantity as $\frac{1}{5}$ milligram of arsenic gravimetrically will be readily understood. The apparatus employed is essentially that above referred to.—Chem. and Drug., September, 1880, p. 388; from Proc. Brit. Phar. Conf., 1880.

Arsenic—Separation and Determination.—Mr. Emil Fischer finds that the method proposed simultaneously by Schneider and Fyfe for the separation of arsenic in toxicological examinations by distillation as trichloride is not generally used, for the reason that in ordinary cases the arsenic is gotten as arsenic acid, which is not affected without previous reduction. He finds, moreover, that ferrous chloride is a reagent specially adapted for this reduction, so that the arsenic can be readily converted into arsenious acid and then distilled as trichloride. Thus, by distillation with hydrochloric acid and ferrous chloride, the arsenic is quickly and completely converted into volatile trichloride, while all the other metals of the sulphuretted hydrogen group, including antimony and tin, remain behind in the liquid with the iron. The estimation of the arsenic in the distillate may be made either gravimetrically as trisulphide, according to Bunsen; or, better, volumetrically, after neutralizing with carbonate of potassium, with iodine solution. Sulphuric acid may be present, but nitric acid must be carefully eliminated.—Am. Jour. Phar., December, 1880, p. 609; from Ber. d. Deutsch. Chem. Ges., xii, p. 1778.

Arsenic—Detection and Determination in Organic Matter.—Chittenden and Donaldson have given Gautier's method of decomposing organic matter containing arsenic (see "Proceedings," 1877, p. 264) a careful revision, and have modified it somewhat. Their analytical results show the great accuracy of the method.—Am. Jour. Phar., December, 1880, pp. 6, 10; from Am. Chem. Jour., ii, p. 235.

Arsenious Acid—Reduction by Baryta.—C. Bramé states that for forty years he has employed baryta for the reduction of arsenious acid, as well as of arsenic sulphides to metal in forensic determinations; the reaction manifested by the mixture of powdered arsenious acid and baryta heated to redness is instantaneous, and is not accompanied by any disengagement of moisture, as is the case when cyanide of potassium or lampblack are employed. The ring formed has a perfectly metallic appearance. There is formed, besides metallic arsenic, barium arseniate, which, if dissolved in nitric acid, gives a red precipitate with silver nitrate. Arsenic sulphides likewise yield arsenic with baryta, but less easily than arsenious acid.—Drug. Circ., May, 1881, p. 69; from Compt. Rendus.

Arseniate of Sodium—Composition.—J. Lefort observes that dry arseniate of sodium has the composition Na_2HAsO_4; in crystals it contains 12 molecules of water, equal to 53.73 per cent. of its weight. According to some chemists, this salt also crystallizes with 7 molecules of water, or 40.39 per cent. If the temperature of a solution of the salt is kept at 30° C., crystals are deposited which contain 4 molecules of water. The author has examined ten different samples of the salt, obtained from as many different sources, and found their water of crystallization to vary from 44.05 to 57.45 per cent.—From Journ. de Pharm. et Chim., 1880, p. 487; in New Rem., August, 1880, p. 244.

Arseniate of Sodium—Method to Restore Water of Crystallization.—The commercial salt contains variable quantities of water of crystallization. It is important that a compound having such dangerous properties should have a constant composition, and G. Fleury therefore recommends the following treatment, whereby a compound containing 14 equivalents of water is uniformly obtained, irrespective of its previous composition: The commercial salt is powdered, spread upon a flat plate, and placed under a bell-jar over a vessel filled with water. At the expiration of ten days, if the temperature of the room ranged between 15° and 30° C., the salt will contain 14 equivalents of water of crystallization. The crystals are exposed to the air for a short time, covered with a fine gauze sieve.—Phar. Centralh., February 10th, 1881; from Schweiz. Wochenschr. f. Phar., 1881, No. 3.

London Purple—Composition and Value as an Insecticide.—Mr. C. V. Riley speaks favorably of this arsenical compound as an insecticide. and points out some advantages which it possesses over Paris green. It is obtained as a by-product in the manufacture of rosanilin, being, in fact, the insoluble precipitate that is produced during the elimination of arsenic in the process of its preparation. This precipitate is dried, powdered, and finely bolted. Analyzed by Professor Collier, it is found to have the following composition: Rosanilin, 12.46; arsenic (arsenious? REP.) acid, 43.65; lime, 21.82; insoluble residue, 14.57; iron oxide, 1.16; water, 2.27; loss, 4.07.—Am. Jour. Phar., July, 1880, pp. 354–356.

Arsenic—New Antidote.—Dr. McCaw suggests the following formula for an antidote for arsenic, and claims for it preference over all others, because it forms the surest antidote, and because the ingredients are always accessible:

Tincture of chloride of iron, ...	℥j
Bicarbonate of sodium (or potassium), . .	℥j
Tepid water, ...	a teacupful.—Mix.

Sesquioxide of iron, suspended in solution of chloride of sodium (containing, however, a large excess of alkaline bicarbonate, REP.), is thus produced. The mixture may be given almost *ad libitum.*—Am. Jour. Phar., August, 1881, p. 430; from South. Med. Rec., 1880

Mr. Philip Hoglan has experimented with the antidote proposed by Dr. McCaw, and finds it to be among the surest—if, indeed, not the surest—of all antidotes, if chemical evidence can be relied on. A solution of half a grain of arsenic was mixed with a small quantity of the magma obtained as above, stirred, and filtered, when the filtrate failed to show the faintest evidence of arsenic.

The author, furthermore, made some experiments with freshly precipitated magnesia, as recommended by Bussy (see "Nat. Dispensatory," second edition, p. 887). One ounce of sulphate of magnesium was dissolved in a little water with gentle heat, aqua ammoniæ added in slight excess, the magma collected on a filter and drained. A portion of this magma, mixed with a solution of arsenic, had precisely the same effect as the above recommended antidote of Dr. McCaw's, and may therefore serve as useful a purpose.—Ibid., October, 1880, p. 486.

ANTIMONIUM.

Antimony—Mining in California.—Mr. Boushey, after giving some historical notes of the antimony mine worked and owned by him in

California, gives the following description of its location, etc.: The mine is thirty-five miles south of Bakersfield, near Summer Station, on the Southern Pacific Railroad. Between the head-waters of the San Emedio and the Pleito Cañons there is a mountain face, which for four miles consists of granite and porphyry covered with fertile earth and heavily timbered with pine. The ledges of granite and porphyry run parallel with the face of the mountain, and slant with it at an angle of nearly forty-five degrees. The antimony is found in a true fissure, of which there are only three other instances in the world. There is one in Freiberg, one in Chili, and one in Mexico. This fissure is the result of the upheaval of what may be called one end of the mountain, or of the depression of its centre. It strikes directly through the mountain at right angles with the granite and porphyry ledges. The ores with which it is filled were thrust up into it from below. At the top it is from thirty to one hundred feet wide, but it widens as it descends. The fissure has been traced across the top of the mountain 5000 feet, and antimony has been found at every point. This ore is found above, and the heavier ores below.—New Rem., December, 1880, p. 380.

Antimony—Preparation in form of a Black Impalpable Powder.—A solution of chloride of antimony is gradually diluted with successive small quantities of water, until, after shaking, the produced precipitate of basic chloride of antimony ceases to be redissolved. The clear liquid is then decanted, after standing a sufficient length of time, and small pieces of aluminium wire are added. This causes a violent disengagement of pure antimonuretted hydrogen, and metallic antimony is deposited as a very fine black powder.—New Rem., February, 1881, p. 51; from Polyt. Notizbl., 1880.

Kermes Mineral—Variable Quality.—It is well known that this preparation is composed of antimony oxide and tersulphuret of antimony. The composition seems, however, to vary very materially, to judge from the results obtained by Mr. Otto Kaspar, who has determined the oxide in a number of samples by the following process, which is based on its solubility in tartaric acid to exclusion of the tersulphuret. 1 gram of the substance is heated several minutes with a solution of tartaric acid; the liquid is filtered, washed, and the filtrate brought to 100 cc. with water. For the purpose of control the residue tersulphuret is dissolved in conc. hydrochloric acid, the solution being likewise brought to 100 cc. In these solutions the oxide is then determined by normal iodine solution (12.7 gm. I and 20 gm. KI pro liter). In this manner four samples were examined, with the following results:

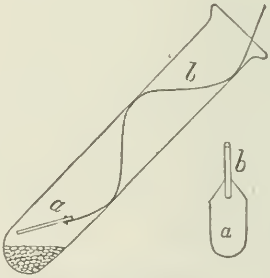
	1	2	3	4
Sb_2O_3,	29.50	37.60	52.95	63 90
Sb_2S_3,	50.15	41.65	27 95	16.05
	79.65	79.25	80.15	79.95

Kermes mineral, made by the process of the Pharm. Helv., II, should have about the following composition: Antimony oxide, 8 per cent.; tersulphuret of antimony, 72 per cent.; water, 20 per cent. The variable composition of the above samples is due partly to imperfect preparation, and partly to careless preservation. When introduced into bottles in a moist condition, it rapidly changes into oxide, hydrosulphuric acid being evolved.—Schweiz. Wochenschr. f. Phar., October 15th, 1880, p. 383.

HYDRARGYRUM.

Mercury—Delicate Test.—A very delicate reaction for mercury is given by Biewend. The substance to be examined for mercury is intimately mixed with twice its bulk of finely-divided metallic copper (obtained by precipitating a solution of sulphate of copper with metallic iron), the mixture introduced into a small test-tube, of about 15 mm. diameter, and a brightly polished disk of gold *a*, fastened (see Fig. 89) to a spirally bent watch-spring introduced so that the disk is immediately over the mixture. The spiral twist of the spring causes the disk to be retained in its place. The test-tube is then heated cautiously in a slanting position, by applying the flame below until the bottom of the test-tube begins to be red hot, at the same time taking care that the gold-disk does not become too hot. The amalgamated disk, after removal, is to be washed with alcohol, if the substance in which mercury was looked for was of a bituminous character. The mercurial mirror may be removed by heating the disk red hot, but the latter will have a dull appearance on cooling, wherever it had been amalgamated. To restore the former brightness, the disk is laid on a flat surface, moistened with a few drops of water, and

FIG. 89.



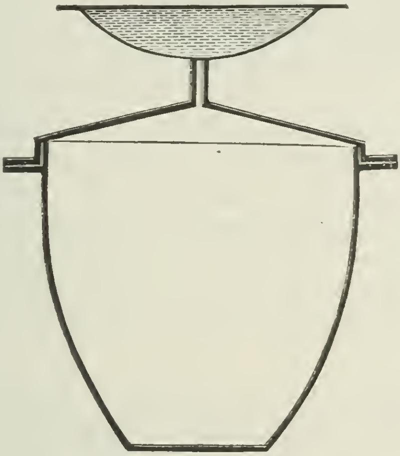
Testing for Mercury.

then rubbed over a few times with a thick steel knitting-needle held horizontally. This smoothens down and depresses the irregularities of the surface, and the disk becomes perfectly bright.

The above test will reveal the presence of as small a quantity as 0.08 milligram.—From Dingler's Pol. Journ., pp. 239, 301; in New Rem., May, 1881, p. 140.

Mercury—Detection of Minute Quantities.—E. Teubner recommends for this purpose a modification of Eschka's gold-cover test, which consists in causing the vapors arising from the dried and faintly ignited substance to impinge against the bottom of a gold capsule filled with water placed over an opening in the crucible lid. Teubner's modification consists in causing the vapors to come in contact only with a small portion of the bottom of the capsule. The apparatus has the form illustrated in Fig. 90; the height of the crucible, as well as its upper diameter, is about 4 centimeters (1¾ inches).

Fig. 90.



Apparatus for Detecting Mercury.

The finely-powdered substance, dried as much as possible, is intimately mixed with well-ignited iron-filings and a little red lead, the mixture placed upon a layer of red lead in the crucible, covered with iron-filings, the lid put on and luted with a paste made of lime. The crucible is now placed over the lamp, and a gold capsule containing water, properly supported, placed over the orifice of the tube ascending from the lid. The heating must proceed very slowly and must only be gradually raised to a faint redness at the bottom of the crucible. Any little drops of water which may first collect at the orifice of the tube must be removed by filtering-paper. The operation is finished in a few minutes, and any mercury present will be found deposited upon the exposed spot of the gold capsule. The identity of this deposit, if not too minute, may be established by bringing upon it a minimal drop of nitric acid, drying thoroughly on the water-bath, and then touching the spot with a strip of filtering-paper moistened with a 1 per cent. solution of iodide of potassium. This causes the production of a characteristic red stain of mercuric iodide, disappearing again on applying an excess of iodide of potassium. If the diameter of the orifice of the tube be 1 millimeter ($\frac{1}{25}$ inch) so small a quantity as 0.0001 gm. (= $\frac{1}{640}$ grain) of mercury, and even less, may be recognized.—From Zeitsch. f. Anal. Chem., 1880, p. 198; in New Rem., July, 1880, p. 207.

Mercury—Determination in Organic Fluids, etc.—The determination of mercury in urine, fæces, etc., is, according to Dr. Hager, readily accomplished as follows: The clear liquid, containing 2 to 3 per cent. of hydrochloric acid, is treated with 3 to 5 per cent. of chloride of sodium, and 5 to 10 per cent. of starch-sugar (glucose), and boiled for fifteen minutes, or, after allowing to come to a boil, heating it on a water-bath for one hour. The mercury is thus deposited as mercurous chloride, which is collected by a subsidence, washed with water containing hydrochloric acid, dried and weighed. The quantity obtained, multiplied by 0.85, gives the quantity of metal. If the deposit has a gray color, due to the reduction of a portion to the metallic state, it is treated with caustic ammonia (or other caustic alkali), washed, dried, and weighed as metal.—Phar. Centralh., January 27th, 1881, p. 46.

Calomel—Stability in Various Admixtures.—Mr. Verne states ("Drug. Circ.," August, 1880; from "Bull. de Thérap.") that calomel, mixed with sugar, chloride of sodium, or citric acid, undergoes no change, and also that the assumed danger of acid drinks, taken when using calomel, is pure prejudice, since calomel in solution with citric acid for ten days underwent no change. Mr. Verne concludes from his experiments that calomel is a much more stable compound than is generally supposed, and that chloride of sodium, at 40° C. (104° F.) has no action whatever on calomel. Mr. Philip Hoglan draws attention to these statements of Mr. Verne, and gives the results of some experiments made with a view to ascertaining their correctness, and also to discover the cause of the discrepancies among different experimenters on this important question. He finds that no evidence of corrosive sublimate is given when calomel and a solution of chloride of sodium or chloride of ammonium are in contact, with frequent agitation, at a temperature of 78° F., for ten days; while with a dilute solution of hydrochloric acid a slight reaction for corrosive sublimate is obtained in twenty-four hours. When, in the case of chlorides of sodium and ammonium, the experiment is conducted at a temperature of 98° F., however, a distinct reaction for corrosive sublimate is obtained after two hours; with dilute hydrochloric and with citric acid the reaction is obtained in one hour, and even water shaken with calomel, at a temperature of 98° F., gave a reaction with stannous chloride after three hours, though not so marked as in the preceding experiments.

The question of the conversion of calomel into corrosive sublimate by sugar, magnesia, bicarbonate of sodium, and carbonate of magnesium was also taken up. Calomel and sugar, rubbed together, failed to give evidence of corrosive sublimate, even after fifteen days' standing. Calomel and magnesia, carbonate of magnesia, or bicarbonate of sodium, treated in the same way, gave evidence of corrosive sublimate after twenty-four hours. The author's experiments seem to prove that Mr. Verne's conclusions are not altogther correct, and that temperature is a great factor in considering the stability of calomel.—Am. Jour. Phar., November, 1880, p. 538.

Calomel—Stability.—Mixtures of calomel with sugar, milk-sugar, gum arabic, licorice-root, marshmallow-root, and aloes, were made by Paul Merres in different proportions, and kept in the state of powder, as well as in pills, in a room in the cellar, and in the drying-closet, in the latter at a temperature of 38° to 45° C. After nine months the powders and pills were examined for corrosive sublimate by treatment with alcohol, and testing the solution with sulphuretted hydrogen and with metallic copper not a trace of mercuric chloride was detected. It was proven by control experiments that by the means indicated mercury could be detected in the solutions in a dilution of 1 in 20,000. —Am. Jour. Phar., May, 1881, p. 248; from Arch. d. Phar., February, 1881, p. 135.

Mercuric Chloride—Compounds with Hydrochloric Acid.—A. Ditte finds that when mercuric chloride is dissolved in hydrochloric acid, and, after cooling to —10° C., hydrochloric acid gas is passed into the solution to saturation, crystals are obtained, which have the formula $HgCl_2,HCl,7H_2O$; they are white, glistening, transparent, and melt at —2° C. If the liquid is saturated with hydrochloric acid gas at +50° C., and a somewhat larger quantity of mercuric chloride is used, upon cooling the liquid to below zero, thick, colorless, transparent crystals, having the composition $3HgCl_2,2HCl,14H_2O$, are obtained. If to the liquid more mercuric chloride is added, and the crystallization is allowed to take place at +15° C., transparent colorless prisms, or smaller needle-shaped crystals, are obtained,—the form depending on the proportion of mercuric chloride added,—which have the composition $4HgCl_2.HCl,12H_2O$, are readily decomposed on exposure to air, and melt at a temperature above +15° C. A solution of mercuric chloride saturated with gaseous hydrochloric acid, between 15° and 40° C, deposits the same crystals, containing, however, only $9H_2O$. Saturated between 80° and 90° C., asbestos-like crystals, having the composition $6HgCl_2,HCl,10H_2O$, deposit on cooling. It is evident from the above observations that a complete series of compounds of mercuric chloride and hydrochloric acid exist.—Chem. Ztg., March, 1881, p. 165; from Compt. Rend., pp. 92, 353.

ARGENTUM.

Silver Nitrate—Method of Depositing Pure Silver for its Preparation.—Mr. P. Solthier considers none of the known and usually employed methods of preparing nitrate of silver useful, and recommends the following, which he considers not only the cheapest, but also the most satisfactory ever proposed: The silver alloy is put into a flask and dissolved with as small a quantity as possible of common concentrated nitric acid, the process being conducted with the exclusion of light. The solution is then precipitated, likewise with exclusion of light, with just as much ordinary hydrochloric acid (free from arsenic) as is necessary to effect complete precipitation, the precipitate being assisted by frequent agitation. After allowing the precipitate to settle, the supernatant liquid is poured off, and the silver chloride, without washing, dissolved in ammonia, the solution being facilitated by gently heating. The solution is then filtered, under exclusion of light, into a tall cylinder, furnished with a cork, in which a riband of copper foil is inserted, reaching to the bottom of the cylinder. The filter is then washed with a little ammonia, the cylinder closed, and shaken at intervals to accelerate the reduction. When a concentrated solution is acted upon the reduction is very rapid, much quicker than when zinc is the reducing agent, and is complete when the blue copper solution has become quite clear, and the copper band is free from adhering particles of reduced silver. The reduced silver is then thrown on a filter, washed with distilled water, and dissolved in pure nitric acid, for the preparation of the pure crystallized or fused salt. In this process, gold would be removed during the first solution. Other metals of possible occurrence, such as lead, bismuth, antimony, tin, and iron (from the hydrochloric acid), would be deposited as hydrated oxides by the ammonia; copper and zinc are retained in solution after the reduction, while arsenic is washed away during the washing of the chloride.—Chem. and Drug., February, 1881, p. 82; from Ber. d. Deutsch. Chem. Gess., January 10th, 1881.

Silver Iodide—Compound with Calcium Iodide.—Maxwell Simpson has obtained the compound $CaI_2,2AgI,6H_2O$ by saturating a hot concentrated solution of iodide of calcium with moist iodide of silver, when, on cooling, it is obtained in form of long white needles. It is completely decomposed on addition of even a few drops of water, iodide of silver being precipitated, and thus affords an easy method of analyzing the salt.—Jour. Chem. Soc., July, 1880, p. 442; from Proc. Roy. Soc., 27, p. 120.

Sesquioxide of Silver—Characters, etc.—Berthelot obtained this compound by the electrolysis of a 10 per cent. solution of nitrate of silver, in the form of large, thick, black, lamellar, striated needles, of brilliant metallic lustre. When exposed to the air at ordinary temperatures it decomposes with evolution of oxygen, and the formation of a black amorphous powder; a little above 100° C. the decomposition takes place with explosive violence. Prolonged washing with water also brings about decomposition, removing nitrate of silver. Analysis of the freshly-prepared substance, rapidly dried by means of blotting-paper, without pressure, showed that it is really a compound of sesquioxide of silver with the nitrate, and has the composition $4Ag_2O_3, 2AgNO_3, H_2O$, or is probably a salt of argento-nitric acid, corresponding to phosphomolybdic acid, thus — $(4Ag_2O_3.N_2O_5)Ag_2O, H_2O$.—Jour. Chem. Soc., July, 1880, p. 442; from Compt. Rend., 90, pp. 653–656.

Sulphate of Silver—Preparation of Crystals.—P. Braham has prepared sulphate of silver in the form of brilliant transparent crystals of high refractive power, by pouring on a plate of pure silver strong sulphuric acid, and adding a few drops of strong nitric acid. At first there was a slight action. In a day or two the whole of the acid acquired a deep purple tint, and after the lapse of two or three weeks, the purple tint sinks towards the silver, and a slight brown tint can be seen on the surface. The layer above the silver being colorless about this period, large crystals form, which redissolve, and the liquid becomes colorless. In the course of a few days brilliant specks are seen, which develop into perfect crystals of a regular octohedral shape. The author has in his possession crystals which have taken over six months in growing.—Jour. Chem. Soc., June, 1881, p. 354; from Chem. News, 42, p. 163.

PLATINUM.

Platinum Metals—Chemistry.—According to v. Schneider, pure palladium may be obtained from the filtrate of platinum-ammonium chloride, by precipitating the metals with zinc and dissolving out the copper and palladium by nitric acid. The palladium is then separated by treatment with mercury, whereby an amalgam is obtained, which, on distillation, leaves the pure palladium. T. Wilson, however, finds that all the platinum metals when precipitated by zinc are soluble in nitric acid, also that it is not possible to remove palladium alone by shaking the solution with mercury, as the latter precipitates all platinum metals. A solution of chloride of platinum may be decomposed by shaking with mercury, and a dark-gray amalgam obtained. Further, the amalgam of platinum metals cannot be freed from mercury by distillation and ignition. By treating such an ignited residue with hydrochloric acid, and precipitation with chloride of ammonium, a compound, $PdCl_2,5NH_4,ClHg_2,Cl_2$, has been obtained; it crystallizes in beautiful concentrically grouped needles; on ignition in hydrogen it yields a residue of mercury and palladium. From the residue, insoluble in hydrochloric acid, by dissolving in aqua regia and removing the platinum by chloride of ammonium, a filtrate was obtained, which, by treatment with salt, and chloride of ammonium and alcohol, yielded palladium-ammonium chloride, which the author finds has the composition $PdCl_2,2NH_4Cl$, and does not contain water of crystallization. On ignition it leaves a residue of spongy palladium, which exhibits the absorption of hydrogen in a very marked manner.—Jour. Chem. Soc., December, 1880, p. 854; from Ber. d. D. Chem. Ges., 13, pp. 1198–1204.

Platinum—Action of Fusing Alkaline Carbonates.—Dr. Konink has found that, contrary to the previously entertained belief, fusing alkaline carbonates decidedly attack platinum vessels, particularly when heated to a high heat. The loss of a crucible amounted at one time to as much as 3 8 milligrams, and the platinum was recovered from the melted mass.—From Zeitsch. f. Anal. Chem. and Ph. Zeit. f. Russ.; in New Rem., August, 1880, p. 245.

Chloride of Platinum—Presence of Chloride of Gold as Impurity.—Professor Gintl obtained anomalous results with some chloride of platinum, purchased from a well-known German manufacturer of platinum preparations. On examination he found the platinum salt to contain more than 3 per cent. of chloride of gold. The presence of this impurity, of course, interferes with determinations of potassium and ammonium, as some of the gold salt is apt to be reduced by the ether-alcohol used in the process, and metallic gold be thereby mixed with and weighed with the precipitate. This impurity may be removed by shaking the concentrated solution of chloride of platinum repeatedly with ether, which dissolves out the gold salt and takes up but little of the platinum salt. The remaining solution of chloride of platinum is then evaporated, until all odor of ether has disappeared, filtered to remove traces of reduced metallic gold; and, finally, warmed with a little chlorine-water.—New Rem., September, 1880, p. 272; from Ber. d. Œst. Ges. and Pharm. Centralh.

Platinic Bromide—Preparation, etc.—V. Meyer and H. Züblin have obtained this compound easily by heating spongy platinum with bromine and aqueous hydrobromic acid at 180° C. in sealed tubes. The residue left on evaporation of the filtered liquid is extracted with water to separate any platinous bromide, and the clear liquid again evaporated and dried at 180° C. Platinic bromide is a black-brown powder, which is not in the least deliquescent, but is readily soluble in water, and still more easily in alcohol and in ether.—Jour. Chem. Soc., July, 1880, p. 445; from Ber. d. D. Chem. Ges., 13, pp. 404, 405.

ORGANIC CHEMISTRY.

HYDROCARBONS.

(*Including Volatile Oils, Resins, etc.*)

Benzin and Benzol—Characters of Distinction.—Mr. J. Biel, drawing attention to a substitution of coal-tar benzin (benzol) for petroleum-benzin, in Russia, gives the following characters whereby the two may be distinguished:

1. *Petroleum-benzin* dissolves iodine with a blue-red (fuchsin) color; does not dissolve asphaltum or liquid storax; is not dissolved by alcohol of 82°; is not affected by fuming nitric acid, floating upon the surface unchanged after the addition of water; and has a specific gravity never exceeding 0.720.

2. *Coal-tar benzin* (*benzol*) dissolves iodine with a yellow-red (wine) color; easily dissolves asphaltum and liquid storax, and is easily dissolved by 82° alcohol; is energetically converted into nitrobenzol by fuming nitric acid, and after the addition of water sinks to the bottom of the liquid; and has a specific gravity never below 0.865.—Phar. Zeitschr. f. Russl., December 15th, 1880, p. 746.

Petroleum Spirit.—In continuation of his previous paper (see "Proceedings," 1880, p. 259), Mr. A. H. Allen has communicated some further notes on petroleum spirit, embracing also shale naphtha and coal-tar benzol.

Shale naphtha is the highly volatile and inflammable liquid obtained as a secondary product in the manufacture of paraffin-wax, and burning oil from the bituminous shale in the South of Scotland. In physical properties it presents the closest resemblance to petroleum spirit; both liquids are known in commerce as "benzoline," and are usually said to be identical in chemical composition. Its behavior when treated with fuming nitric acid is quite different from that of petroleum spirit. The following table summarizes the author's tests for distinguishing the three hydrocarbons:

Mode of Treatment.	Petroleum Spirit.	Shale Naphtha.	Coal-tar Benzol.
a. Sp. gr. of sample.	0.690	0.701	0.876
b. Boiling-point of sample.	65° C.	66° C.	81° C.
c. Solvent action on coal-tar pitch.	Very slight solvent action; liquid but slightly colored, even after prolonged contact.	Behaves similarly to petroleum spirit.	Readily dissolves; pitch forming a deep brown solution.
d. Behavior of the sample when three measures of it are shaken with one measure of fused crystals of absolute carbolic acid.	No apparent solution. The liquids are not miscible.	The liquids form a homogeneous mixture.	The liquids form a homogeneous mixture.

—Chem. and Drug., September, 1880, p. 386; from Proc. Br. Phar. Conf., 1880.

Benzin—Easy Method of Deodorization.—Mr. R. F. Fairthorne observes that if to each gallon of benzin three ounces of powdered quicklime are added, and well shaken, a great deal of the peculiar sulphuretted odor will be removed, and articles that have been washed in it will have no disagreeable smell. The addition of freshly burnt charcoal may also be made with advantage.—Am. Jour. Phar., August, 1880, p. 407.

Petroleum Product Suitable for Ointments.—Mr. R. C. Clark offers the following process, which will produce an ointment-like body of handsome appearance and quality: Take a quantity of crude paraffin, such as settles in the bottom of oil-tanks, and which is known in the oil regions as *B. S.* oil, and add, if necessary, to lower the boiling-point, a sufficient quantity of crude petroleum rich in paraffin, such as Smith's ferry oil; place the whole in a still, and distil off at as low a temperature as possible all oils above 43° gravity, Baumé; filter the residuum through animal charcoal at a temperature of from 150° to 180° F. To make an exceedingly fine article, it will require three pounds of residuum and two and a half pounds of animal charcoal for one pound of finished goods. Two pounds of residuum will remain in the charcoal. A product having a melting-point of 112° F. should be aimed at; this can be made into an ointment having a lower melting-point by the addition of the proper proportion of the paraffin oil, which is sometimes called spindle oil.—Drug. Circ., January, 1881, p. 2.

Mineral Oils—Purification.—According to C. A. Riebeck, mineral oils may be deprived of phenol and disagreeable odor by washing them with a solution of chloride of lime in alcohol and caustic soda. According to the quality of the oil, 5 to 9 parts of this solution are used for every 100 parts of oil.—From Dingler's Polyt. Journ.; in New Rem., August, 1881, p. 244.

Picene—A New Hydrocarbon from Coal-tar.—O. Burg has extracted from the last products of the distillation of coal-tar pitch a new hydrocarbon, which he has named picene. It forms, when pure, white scales, showing a blue fluorescence, has the composition of $C_{22}H_{14}$, and forms a new member of the series of hydrocarbons which commence with benzol (C_6H_6), and which includes naphthalene ($C_{10}H_8$), anthracene ($C_{14}H_{10}$), chrysene ($C_{18}H_{12}$), and picene ($C_{22}H_{14}$). The new hydrocarbon is insoluble in most solvents; boiling glacial acetic acid, benzol, and chloroform only dissolve a slight amount; light oil of coal-tar, boiling at 150° to 170° C., is the best solvent. Its fusing-point is 345° C., the highest of any known hydrocarbon. The author also prepared its quinone (picequinone—$C_{22}H_{12}O_2$) and the bromine derivative $C_{22}H_{12}Br_2$.—Am. Jour. Phar., December, 1880, p. 611; from Ber. d. Deutsch. Chem. Ges., xiii, p. 1834.

Picene—Occurrence in California Petroleum.—C. Gräbe and J. Walter have obtained picene from the crystalline substance resulting when the residue of the rectification of California petroleum is subjected to dry distillation at a high heat. By repeated extraction with alcohol, bisulphide of carbon, and benzol, having a high boiling-point, and final crystallization from the latter solution, the picene was obtained, slightly yellowish in color. They agree with Burg in the formula ($C_{22}H_{14}$), but give the melting-point at 330°. to 335° C. The boiling-point is 518° to 520° C.—Chem. Ztg., March 10th, 1881, p. 165; from Ber. d. Deutsch. Chem. Ges., pp. 14, 175.

Essential Oils—Improved Apparatus.—The well-known firm of Schimmel & Co., of Leipzig, have patented an improved apparatus for distilling volatile oils. A tall conical column is used as the still. About eight inches from its bottom is a perforated diaphragm, or false bottom, upon which the seeds, herbs, or other material to be distilled are placed or heaped, by introducing them through the still-head. A perforated coil below the diaphragm projects steam upwards through the mass, which is occasionally agitated from without by means of a horizontal stirring apparatus. Any condensed water which may run back is converted into steam by the heating coil at the bottom. Meanwhile the mass itself is heated by a long coil lining the body of the still, and carrying steam at a high pressure. Whatever of essential oil is carried forward by the steam, passes through the still-head into the cooler, where both oil and steam are condensed, and from where they flow (through a small funnel-tube) into three successive receivers, which are arranged like Florence flasks, and which retain the essential oils that have separated. From the last receiver the water, which is still impregnated with oil, enters another reservoir, and from there it flows into a small globular still, situated underneath, in which, by means of steam, nearly all the oil still retained is again volatilized with the steam of water, and both again conducted to the cooler.—From Dingler's Polyt. Jour., vol. 238, p. 428; New Rem., March, 1881, p. 78.

Volatile Oils—New Form of Apparatus for Distillation.—Messrs. Drew, Heywood, and Barron employ, for the distillation of volatile oils, an apparatus which is essentially that originally described by P. Perrenond (see Proceedings, 1876, pp. 272, 273), differing only in that a mechanical stirring arrangement is attached. This stirring arrangement consists of a perpendicular shaft bearing a framework of iron curved so as to conform to the interior shape of the still, and carrying a chain which scrapes over the inner surface of the still while the stirrer is turned. This may be done either by hand or steam.—See New Rem., May, 1881, p. 136.

Essential Oils—Detection of Alcohol.—Mr. A. Drechsler employs a solution of 1 part potassium bichromate in 10 parts nitric acid, of specific gravity 1.30. Alcohol, if present, is at once betrayed by the pungent odor of ethyl nitrite.—Zeitschr. f. Anal. Chem. and Chem. News, December 23d ; New Rem., March, 1881, p. 81.

Oil of Turpentine—New Uses.—Dr. James Foulis mentions, in the Edinburgh "Medical Journal," the following uses of turpentine that are not generally appreciated. In making post-mortem examinations, by coating the hands and arms with oil of turpentine, the risk of putrid infection is much diminished, and on washing afterwards with soap and water, all odor is completely removed. He accounts for this by a theory that, when the skin is unprotected, the epithelial layer of the skin absorbs the fatty and other fluids, the odor of which is given off for some time in spite of frequent washing. His method is to rinse the hands thoroughly with the oil before commencing the examination. After the work is finished, the hands are to be scrubbed with turpentine, using a nail-brush, after which soap and hot water are to be employed; a pleasant terebene odor remains.

Dr. Foulis also uses oil of turpentine as a remedy for parasitic skin affections. He gives the following method pursued in several cases of ringworm of the scalp. The head was held over a basin of hot soap-water, and oil of turpentine was then poured on each affected spot. When smarting began to be quite apparent, the head was well washed with the soap-water, rubbing in the soap. One application of the turpentine is usually sufficient to destroy the parasite.—New Rem., December, 1880, p. 371.

Colophony—Products of Distillation.—Mr. Ad. Renard submitted the products of the distillation of colophony to repeated fractional distillation and isolated two new hydrocarbons, which he has named *hepten* and *dihepten.* The first boils at 103° to 106° C., the second at 235° to 240° C.

Hepten is a colorless, mobile liquid, possessing a peculiar odor, and is soluble in alcohol and ether. Its density at 20° is 0.8031, and it is without action on polarized light. By the action of chlorine resinous products are formed, while by the action of bromine a crystallizable bromide is produced, which, when suitably purified, has a composition corresponding to the formula $C_7H_6Br_6$. This the author has named *hepten hexabromide.* It melts at 134°, and decomposes at 150° C. with the liberation of hydrobromic acid. Fuming nitric acid acts upon hepten with great violence with the production of resinous products.

Dihepten is a very readily oxidizable hydrocarbon, becoming rapidly resinified when exposed to the air. It is capable of uniting with the elements of water to form a crystalline hydrate, which can be abundantly obtained by exposing for some time a small amount of the hydrocarbon, in contact with water, in loosely-stoppered vessels.—Am. Jour. Phar., November, 1880, p. 552; from Jour. de Phar. et de Chim., October, 1880.

Monobromated Camphor—Production of Thymol by the Action of Chloride of Zinc.—Schiff finds that if a mixture of chloride of zinc and monobromated camphor be heated to about 150° to 160° C. in an oil-bath, streams of hydrobromic acid escape, and if, after the reaction is ended, the mixture be distilled over the naked flame a fluid is obtained which consists chiefly of two substances,—a hydrocarbon and a phenol. The former is shown to be a hexahydro-xylol (C_8H_{16}); the phenol has the formula $C_{10}H_{14}O$, and appears to be a liquid thymol, in fact, the same as that obtained by Kekulé by the action of iodine on camphor.—Am. Jour. Phar., October, 1880, p. 495; from Ber. d. Deutsch. Chem. Ges., xiii, p. 1407.

Camphoric Acid—Preparation.—Mr. R. F. Fairthorne recommends the following process: Camphor is boiled for twenty to twenty-four hours with 15 to 16 parts of strong nitric acid. Upon cooling, the crystalline cake of camphoric acid, floating upon the surface of the liquid, is removed and carefully washed with ice-cold water. It now consists of a mass of acicular snow-white crystals. From this acid

Camphorate of ammonium is easily produced by neutralizing it with solution of ammonia (stronger), evaporating by a very moderate heat to a syrup, and until a pellicle begins, and then setting aside to crystallize. It is a beautiful crystalline salt, and is used for its sedative properties, resembling monobromated camphor, but, unlike that compound, being freely soluble in water. The dose is 5 to 10 grains.—Am. Jour. Phar., August, 1880, pp. 408, 409.

Eugenic Acid—Characters, etc., when Obtained from Various Sources.—Mr. L. C. Pettit has isolated eugenic acid from oil of cloves, oil of pimento, and oil of bay, obtaining 72, 61, and 41 per cent. of rectified acid respectively. The eugenic acid from oil of cloves and from oil of pimento gives a red color with strong sulphuric acid, changing to purple; that from oil of bay produces a crimson color under the same conditions, and when treated with sulphuric acid and bichromate of potassa it turns green; while with strong nitric acid a deep brown-red liquid and a resinous mass are formed. Throughout the author's experiments the acid prepared from the three oils gave similar reactions under the same treatment, and their physical properties were alike; the specific gravity of the acid from oil of pimento was found to be 1.0785. It is obtained most easily from oil of pimento, but most economically from oil of cloves. When applied to the skin it produces a burning sensation.—Am. Jour. Phar., September, 1880, p. 443.

Volatile Oil of Buchu Leaves—Characters and Composition.—Professor Flückiger has examined the crystalline substance separated from essential oil of buchu by the aid of caustic soda. He found that it belonged to the class of phenols, and in allusion to Diosma, the Linnæan name of the buchu genus, he has named it

Diosphenol.—Its formula is $C_{14}H_{22}O_3$; the crystals melt at 83° C. (181.4° F.), and boil at 233° C. (451.4° F.). It is readily soluble in alcohol of specific gravity 0.83, less so in ether, but very sparingly in water. The aqueous solution in boiling water, on cooling, affords small acicular crystals. The solutions are perfectly neutral, and, on the addition of an alcoholic solution of ferric chloride, assume a dark dingy-green coloration. The crude oil, as well as the water distilled from buchu leaves, exhibit the same behavior. Diosphenol has a slightly aromatic odor and taste, *sui generis*, by no means reminding of buchu leaves.

The buchu oil which has been exhausted with caustic lye, on further treatment, distilled chiefly between 205° and 210° C. This oil is remarkable from its odor, which agrees very nearly with that of peppermint. No other essential oil known to the author possesses this aroma except peppermint. The oil under examination is devoid of rotatory power, and consists of one of the numerous modifications of the molecule $C_{10}H_{18}O$, the presence of which is more and more ascertained among the constituents, both solid and liquid, of essential oils.—Chem. and Drug., September, 1880, p. 381; from Proc. Brit. Pharm. Conf., 1880.

Oil of Peppermint—Constitution.—Besides the solid compound termed menthol ($C_{10}H_{19}OH$), no other constituent of oil of peppermint had hitherto been isolated. Professor Flückiger and Dr. F. B. Power have now experimented to determine the nature of the liquid constituents, using for this purpose Mitcham oil (supplied by Schimmel & Co. of Leipsic), which was deprived as completely as possible of menthol. This oil was subjected to fractional distillation. The largest portion distilled at 165° to 170° C., a smaller fraction, somewhat viscid, at 250° to 275° C. The first fraction, purified by repeated distillation over metallic sodium, divided into two fractions, boiling respectively at 165° to 170° C. and 173° to 176° C.; at the same time the peppermint odor of the original liquid disappeared, and gave place to that of freshly distilled oil of turpentine. The two fractions were then separately submitted to analysis, and both were found to correspond to the formula $C_{10}H_{16}$. The specific gravity of the former is 0.859, of the latter 0.856, at 20° C.

The small fraction collected at 250° to 275° C. afforded, after repeated rectification over metallic sodium, a colorless limpid liquid, boiling at 255° to 260° C. It was analyzed, and the formula proved to be $C_{10}H_{16}$, or rather the multiple $C_{15}H_{24}$. Its specific gravity is 0.912, at 21° C.; its rotation in sodium light, in a tube of 100 mm., at 25° C., is 9° 2′ to the right.—Chem. and Drug., September, 1880, p. 381; from Proc. Brit. Pharm. Conf., 1880.

Oil of Eucalyptus—Application in Surgery.—Dr. Siegen proposes the oil of eucalyptus for use as an antiseptic surgical dressing, by dissolving 3 grams of the oil in 15 grams of alcohol, and then diluting with 150 grams of water. In this he soaks ordinary gauze, which is then applied wet, covered with gutta-percha tissue, and held in place with gauze bandages. This causes no irritation, even of very sensitive skins, but is perfectly antiseptic. It can also be used in other ways common with antiseptic solutions.—New Rem., March, 1881, p. 85.

Rose Oil—Otto of Roses.—Mr. Charles G. Warnford Lock has written a comprehensive paper on oil of rose, embracing the cultivation of the rose, collection of the petals, distillation, characters, and adulteration of the oil, etc. In the main the paper does not bring anything that is absolutely new, but contains in condensed form much useful information in connection with the subject, for which see "Phar. Jour. Trans.," April 30th, 1881, pp. 899, 900.

Attar of Rose—Tests.—A. Ganswindt recommends the following tests: Agitate 1 drop of the oil with 45 grams of warm water, and sprinkle the solution in a moderately warm room, which will soon be filled with a rose odor, in which foreign odors may be detected without difficulty. An adulteration with a fixed oil produces a permanent grease stain upon paper, and spermaceti is left behind on the evaporation of a few drops of the oil from a watch-crystal in a water-bath.

On mixing a few drops of pure oil of rose with an equal bulk of sulphuric acid, the rose odor is not changed, but oils used for adulteration change their odor, which becomes apparent in the rose odor; or 5 drops of the oil are mixed in a dry test-tube with 20 drops of pure concentrated sulphuric acid. When the mixture is cool, it is agitated with 20 grams of absolute alcohol, when a nearly clear solution should be obtained, which, heated to boiling, remains clear yellowish-brown on cooling. In the presence of the oils of rose-geranium, palma rosa, etc., the alcoholic mixture is turbid, and on standing separates a deposit without becoming clear.—Am. Jour. Phar., May, 1881, p. 250; from Seifens. Ztg., 1881, p. 32.

Volatile Oil of Hemp—Characters, etc.—The essential oil from *Cannabis indica* has already been examined by Bohlig and by Personne, the latter obtaining from it a liquid and a solid hydrocarbon. L. Valente has now prepared the essential oil from ordinary hemp (*C. sativa*) by distilling the fresh leaves with water, and agitating the milky distillate with ether. The oil dried over chloride of calcium, and distilled repeatedly from sodium, is colorless and mobile, and boils at 256°–258° C. Its specific gravity at 0° is 0.9292. The analysis agreed with the formula $C_{15}H_{24}$; the vapor density, however, could not be determined by the ordinary methods, as it decomposes at 300° C. The oil mixes in all proportions with alcohol, ether, and chloroform. Bromine acts energetically on it, forming a crystalline compound, which has not yet been investigated. Nothing at all resembling the solid hydrocarbon mentioned by Personne could be observed.—Jour. Chem. Soc., May, 1881, p. 284; from Gazz. Chim. Ital., 10, pp. 479–481.

Volatile Oil of Mustard—Tests, Particularly for the Presence of Bisulphide of Carbon.—Professor F. A. Flückiger, referring to a recent examination of mustard oil, adulterated with bisulphide of carbon, remarks that the determination of the latter as ethylxanthogenate of potassium (by treatment with alcohol, caustic potassa, and ether, in the manner indicated in his "Pharmaceutische Chemie," p. 42), is not absolutely accurate, since the pure mustard oil itself takes part in the reaction; that is to say, the decomposition products of the mustard oil will also form dark-colored precipitates with copper salts, which may be mistaken for that produced by xanthogenate of potassium. The author draws attention, therefore, to another test, which, though not yet fully perfected, appears calculated to give reliable results. It depends upon the formation of *thiosinamin* ($SCNH(C_3H_5)NH_2$) when mustard oil combines with ammonia, 100 parts of oil yielding theoretically 117.7 parts of thiosinamin. 5 grams of pure mustard oil were warmed with 2.5 grams of absolute alcohol, and 8.6 grams of ammonia-water, specific gravity 0.960, to about 60° C., in a loosely stoppered flask. After a quarter of an hour the mixture became clear, of a yellow color, and, at the expiration of an hour, the odor of mustard oil had disappeared. Evaporated on a watch-glass upon a water-bath until no further considerable reduction of temperature took place, a white crystalline mass of thiosinamin remained, which, when completely dry, weighed 5.634 grams (112 parts from 100 parts oil). Other experiments, with slight deviation from their procedure, gave 111, 112.3, and 115.7 parts respectively, from 100 parts of oil; while 100 parts of mustard oil (4 grams), adulterated with bisulphide of carbon, furnished only 90 parts of thiosinamin (3.6 grams). This very neat reaction is, however, accompanied by an unavoidable error the formation of some sulphocyanide of ammonium; and, although the amount of this is quite small when proper care is exercised, it still remains to be studied under what conditions the formation of the sulphocyanide is most limited.

Under these circumstances Professor Flückiger regards it best to distil off the bisulphide of carbon, when the quantity present will admit, and to determine the specific gravity and boiling-point. The adulterated oil examined had the specific gravity 1.073 at 20° C.; after distilling off the bisulphide of carbon (heating for one day at 80° C.) the specific gravity approaches the correct number, 1.021, and the specific gravity of the distillate was increased to 1.20. It was incidentally also observed that the adulterated oil, after several months' standing, even in dispersed light, became very dark brown, and formed a dirty brown-red deposit, while the pure oil underwent no change under these conditions. Such a remarkable distinction is, however, not manifest when the oils are exposed to direct sunlight, in which case the pure oil becomes also dark-colored very quickly.—Am. Jour. Phar., November, 1880, p. 554; from Phar. Post., No. 17, 1880.

ALCOHOLS, ETHERS, ETC.

Alcohol—Historical Notes.—Professor James F. Babcock contributes a very interesting paper on the history of alcohol, tracing it from the very earliest ages to the present day. The paper is supplemented with copious notes by the editor of "New Remedies," which see, December, 1880, pp. pp. 359–362.

Alcohol—Preparation.—According to "Bied. Centr." (1880, p. 485), comparative experiments on mashing potatoes with sulphuric acid and with malt showed that the yield of alcohol obtained by means of the latter was very little greater than that obtained by boiling with sulphuric acid at the ordinary pressure.—Jour. Chem. Soc., November, 1880, p. 833.

Alcohol—Freezing-point of Various Mixtures with Water.—F. M. Raoult has determined the freezing-point of mixtures of water and alcohol in successive proportion, and communicates the following table:

Freezing-point of the Mixture.	Weight of the Alcohol added to 100 g. Water.	Volume per cent. of the Alcohol.	Freezing-point of the Mixture.	Weight of the Alcohol added to 100 g. Water.	Volume per cent. of the Alcohol.
— 0.5	1.32	1.6	— 9.0	21.90	21.9
— 1.0	2.65	3.2	— 10.0	23.60	23.3
— 1.5	3.97	4.8	— 12.0	27.60	26.4
— 2.0	5.50	6.3	— 14.0	31.30	29.1
— 2.5	6.62	7.8	— 16.0	35.10	31.3
— 3.0	7.95	9.2	— 18.0	39.00	33.8
— 3.5	9.27	10.6	— 20.0	42.80	36.1
— 4.0	10.60	11.8	— 22.0	46.60	38.3
— 4.5	11.90	13.1	— 24.0	50.60	40.0
— 5.0	13.00	14.2	— 26.0	54.80	41.6
— 6.0	15.30	16.4	— 28.0	59.20	43.7
— 7.0	17.80	18.7	— 30.0	64.60	46.2
— 8.0	19.80	20.4	— 32.0	70.00	47.9

As is well known, only the water freezes under the above conditions. It is found by the author that when cider, beer, and wines were frozen, the temperature was always lower than that required to freeze mixtures of water and alcohol of corresponding strength. This he attributes to the saline and acid components of the former.—Phar. Centralh., November, 4th, 1880; from Ann. Chem. Phys., 1880, p. 207, and Ber. d. Chem. Ges.

Alcohol and Ether—Reagent for the Presence of Water.—Mr. C. Mann gives the following process: Mix 2 parts citric acid and 1 part molybdic acid; heat until incipient fusion, and warm with 40 parts of water. Filter-paper dipped in this and dried at 100° C. is blue. In alcohol or ether free from water the color remains unchanged, but if water be present the paper will lose its color, especially if warmed.—Am. Jour. Phar., November, 1880, p. 546: from Dingl. Polyt. Jour., 236, p. 336.

Ethyl Peroxide—Preparation and Characters.—Berthelot prepares this compound by passing through anhydrous ether a slow current of oxygen, absolutely dry, and strongly ozonized. The peroxide of ethyl remains as a dense syrupy liquid, miscible with water. If cooled down to —40° C. it becomes viscous, but does not crystallize. If heated in a glass-tube it distils over in part, but the experiment terminates with sudden and very violent explosion.—Chem. News, May 20th, 1881, p. 233; from Compt. Rend., April 11th, 1881.

Ethyl Chloride—Two new Anæsthetics Produced by the Action of Chlorine.—Dr. E. Taube enumerates the following products produced by the action of chlorine upon ethyl chloride ($CH_3 - CH_2Cl$; boiling-point, 12° C.):

Ethylene chloride,	$CH_2Cl - CH_2Cl$,	boiling-point	35° C.
Ethylidene chloride,	$CH_3 - CHCl_2$,	"	60° "
Monochlorethylene chloride,	$CH_2Cl - CHCl_2$,	"	115° "
Monochlorethylidene chloride,	$CH_3 - CCl_3$,	"	75° "
Dichlorethylene chloride,	$CHCl_2 - CHCl_2$,	"	137° "
Dichlorethylidene chloride,	$CH_2Cl - CCl_3$,	"	102° "
Pentachlorethane,	$CHCl_2 - CCl_3$,	"	146° "
Perchlorethane,	$CCl_3 - CCl_3$,	"	182° "

The author reports the results of experiments made with *monochlorethylidene chloride* (specific gravity, 1.372) and *monochlorethylene chloride* (specific gravity, 1.422), which have an odor resembling that of chloroform, and produce anæsthesia without decreasing respiration or circulation.—Am. Jour. Phar., December, 1880, p. 603; from Phar. Centralh., 1880, p. 387.

Hydrobromic Ether—Etherification of the Hydrobromic Acid.—According to experiments of A. Villiers the extent to which hydrobromic acid, when treated with absolute alcohol and a mixture of alcohol and water, undergoes etherification, varies greatly with the temperature. Absolute alcohol, with different proportions of hydrobromic acid, and heated at different temperatures, gives the following results:

	Percentage of acid acidified.	
	$\frac{1}{2}HBr + C_2H_6O$.	$\frac{1}{10}HBr + C_2H_6O$.
At ordinary temperature, limit 658 days,	68.0	52.5
At 44° temperature, limit 658 days,	79.6	59.9
At 100° temperature, limit 658 days,	88.7	80.0

The percentage of acid converted into ether is not so great as that of the carbon acids; moreover, it is not fixed, but increases with the temperature. These results show that combinations of alcohol with hydrobromic acid are formed analogous to hydrates. The presence of water decreases the extent of etherification, and in large quantity prevents any action from taking place; the quantity of water required to prevent the action increases with the temperature. This is probably due to the formation of hydrates of hydrobromic acid, and the dissociation of these hydrates as the temperature is raised.—From Compt. Rend., 90, pp. 1488–1491, and Jour. Chem. Soc., February, 1881; in Phar. Jour. Trans., February 19th, 1881, p. 700.

Bromide of Ethyl—Poisonous Action.—Dr. Isaac Ott has experimented on rabbits with bromide of ethyl, and finds that when either inhaled or used subcutaneously it kills by a toxic action upon the respiratory centres; that the decrease and frequency of the heart's action contribute to the paralysis of these centres, by injection of the ethyl into a jugular vein, towards the heart; that in toxic doses it depresses momentarily the frequency of the pulse, followed by a permanent rise to a normal rate, but it depresses the tension of the pulse steadily, due, mainly, to the depressing action of the drug upon the heart, and somewhat less to a partial loss of tone of either the spinal vaso-motor centres, or the peripheral vaso-motor system. The inhibitory power of the pneumogastric is not paralyzed.—From Detroit Lancet; in New Rem., December, 1880, p. 365.

Acetic Ether—Continuous Process.—J. A. Pabst has devised a process in imitation of that for the preparation of common ether. 50 cc. sulphuric acid and the same quantity of alcohol are heated together in a retort to 140° C., and then a mixture of 1 liter of 96 per cent. alcohol and 1 liter acetic acid (93 per cent.) is allowed to flow in slowly. At first some ethyl ether goes over, and then a liquid which contains, with considerable uniformity, 85 per cent. of acetic ether. The reaction takes place between 130° and 135° C.; the yield is 1350 grams or 78 per cent., which is 90 per cent. of the theoretical quantity. The process can be applied to the production of "methylacetic ether," but side reactions interfere with the preparation of "amylacetic ether" in an analogous manner.—Am. Jour. Phar., September, 1880, p. 467; from Bull. Soc. Chim., xxxiii, pp. 350, 351.

Acetic Ether—Detection of Free Acid.—According to Bouvier, the detection of free acid in acetic ether is best accomplished by agitating, in a small vial, 20 to 25 grams of the ether with 3 or 4 grams of litharge, and setting aside for a day. If free acid is present, the litharge will be covered with a white layer. By washing the sediment well with water, drying, and weighing, the loss of weight will give the amount which has been converted into acetate of lead, and from this the free acid is readily calculated.—Am. Jour. Phar., December, 1880, p. 202, and Pharm. Zeit., 1880, p. 477; from Jour. de Phar. et Chim.

Formic Ether—Preparation.—Mr. Henry Trimble offers the following process for the preparation of formic ether, in which the alcohol is added during the formation of the acid from oxalic acid and glycerin: Ten parts each of oxalic acid and glycerin with one part of water are heated in a flask, connected with a condenser, for about twelve hours, at a temperature between 100° and 110° C. When effervescence has ceased, a small quantity of liquid will be found in the receiver, but as this is largely water it may be rejected. To the mixture in the flask, consisting of glycerin and formic acid, four parts of alcohol are added, and the whole kept at a temperature not exceeding 50° C. for several hours. It is then submitted to distillation, and continued until the thermometer indicates 120° C. The upper of the two layers of distillate formed is separated, washed with water containing a little sodium hydrate, and distilled. The yield is about four parts (one-half the theoretical quantity), having a specific gravity .910, at 15.5° C. *Amyl formate* may be prepared in the same way.—Am. Jour. Phar., March, 1881, p. 104.

Ethyl Sulphate — Preparation. — According to A. Villiers, neutral ethyl sulphate can be prepared by distilling in a vacuum a mixture of sulphuric acid and alcohol. 200 grams of absolute alcohol, distilled *very slowly* in this manner with twice their volume of concentrated sulphuric acid, yielded from 25 to 30 grams of the neutral ether. The end of the operation is indicated by the frothing of the contents of the retort, and by an increase of the internal pressure. The distillate separates into two layers, the lower of which consists of the pure ether. There is no advantage in using fuming sulphuric acid, or in substituting ordinary ether for alcohol. The boiling-point of ethyl sulphate, under a pressure of 45 mm., is 120.5°, which falls regularly 2.5° as the pressure diminishes 5 mm. It solidifies at about —24.5°, and when treated with warm baryta water, it gives the theoretical quantity of barium ethyl-sulphate, and alcohol.—Jour. Chem. Soc., November, 1880, p. 797; from Compt. Rendus, pp. 90, 1291, 1292.

Chloroform and Bromoform—New Method of Preparation.—In a former paper Mr. Albert Damoiseau had described a method by means of which the substitution of chlorine and bromine in hydrocarbon compounds could be effected by the combination of an elevated temperature and the condensing properties of certain porous bodies. He now gives the results which he has obtained by the application of this method to the preparation of the chlorine and bromine derivatives of the methylic series. Taking methyl chloride as the starting-point, the compounds dichlormethane (CH_2Cl_2), chloroform ($CHCl_3$), and carbon tetrachloride (CCl_4) may be very easily obtained by the following process:

A steady current of chlorine, furnished by a continuous generating apparatus, previously mixed with the requisite proportions of methyl chloride, is made to pass through a long tube containing animal charcoal, and heated from 250° to 350° C. At the commencement of the reaction, it may be readily seen from the free end of the tube that the operation proceeds with perfect regularity, and that the chlorine has absolutely disappeared. The gas is then cooled, after which it is washed with water to remove the hydrochloric acid. The product thus obtained will be found to correspond to the mixture of chlorine and methyl chloride used. By this means it is possible to prepare many hundreds of grams of chloroform.

The reaction is effected with such promptness that the economic production of chloroform by this process can no longer be a matter of doubt. It is only necessary that sufficiently pure methyl chloride be procurable at a reasonable price.

The reaction of bromine on methyl bromide may also be accomplished very easily, and thus there may be produced at will the different compounds:

Dibrommethane (CH_2Br_2).
Bromoform ($CHBr_3$).
Carbon tetrabromide (CBr_4).

The author's observations also show that a large number of substitution derivatives may be obtained when they are stable at the indicated temperature (*i. e.*, between 250° and 350° C.). This influence of temperature is often found to be modified by the conditions of the operation, and especially by the presence of animal charcoal.—New Rem., March, 1881, p. 71; from Compt. Rend., 1881, xcii, p. 42.

Dichloride of Ethidene ($CH_3,CHCl_2$)—*Characters and Uses.*—Mr. J. T. Clover reports his experience with the administration of dichloride of ethidene in 1877 cases, without having to note a fatal case, though at times he had noticed a depression of the pulse which had alarmed him. His usual plan of giving it consisted in first getting the patient nearly unconscious by means of nitrous oxide gas, and then gradually adding the vapor of ethidene, the quantity of the latter being determined by circumstances which are detailed by the author.

Ethidene dichloride mixes freely with alcohol, but only slightly with water,—enough to flavor it only, but less than chloroform, which it resembles in taste and smell. It is less inflammable than alcohol. A piece of paper saturated with it does not readily take fire, but air passed through the liquid takes up a vapor which makes it burn at a jet like coal-gas. That found at present in the market has not a uniform boiling-point, and can be divided by fractional distillation into two or more substances. The specific gravity of the article used by the author was 1.225, and this begins to boil at 115°, the temperature rising to 140°, which remains constant until it is nearly all dissipated. The commercial article seems to be imported from Germany. Some samples have a disagreeable after odor.—New Rem., September, 1880, p. 271; from British Med. Jour., May 10th, 1880.

Acetol (CH_3,CO,CH_2,OH)—*Preparation and Characters.*—A. Emmerling and R. Wagner have obtained from acetone, by the action of oxide of silver or an alkaline carbonate on monobromacetone, a body which they name acetol. It was obtainable, however, only in solution, the strongest obtained being estimated to contain not more than 11 per cent. It appears to be very soluble in water, to which it imparts a pleasant odor and a nutlike taste. It boils above 100° C., and is volatile in steam. Its specific gravity is greater than that of water. When distilled, it yields a liquid containing more water and a residue containing more acetol. When a frozen solution thaws, the portion which first liquefies contains more acetol than the rest. The solution of pure acetol has a neutral reaction, but on boiling with water an acid body is formed. It is destroyed by strong dehydrating agents, and such bases as lime and baryta.—Jour. Chem. Soc., December, 1880, p. 867; from Lieb. Annal., pp. 27–49, 204.

Chloral—Cause of Change into Meta-Chloral.—It is known that chloral, however preserved, at the end of a variable time becomes insoluble in water, in which state it is known as meta-chloral. M. Byasson in investigating the cause of this change has found that anhydrous chloral, if only purified by rectification, however frequently repeated, always retains traces of sulphuric acid. But if these be removed by agitating the chloral with 1 per cent. of its weight of caustic baryta, decanting and redistilling, the anhydrous chloral can be kept an indefinite time without alteration. Hydrochloric acid, though more slowly and incompletely than sulphuric acid, also induces the conversion into meta-chloral, which is, moreover, more rapid under exposure to light. —Drug. Circ., April, 1881, p. 51.

Chloral Hydrate—Definite Compound with Camphor.—Messrs. Cazeneuve and Imbert have made experiments which lead them to the conclusion that the liquid produced when chloral hydrate and camphor are brought together is a definite compound, which, according to circumstances, may contain the one or the other of its components in excess. A faint reduction of temperature is observed during the formation of the compound. When made in molecular proportions, the new compound has a specific gravity at + 17° C. of 1.243; it is sticky, has the appearance of glycerin, does not affect the skin, has the odor of both components, tastes acrid and bitter, dissolves in alcohol, ether, chloroform, the fixed and volatile oils, and is decomposed by water with separation of camphor unchanged; but water containing chloral hydrate does not decompose the compound.—Zeitschr. Œst. Apoth. Ver., December 1st, 1880, p. 529; from Jour. de Pharm. et de Chim., September, 1880, p. 207.

Chloral—Physiological Action.—Mr. F. B. Power draws attention to the fact that the alkaline reaction of the blood is due, not to the presence of *free* alkali, but to *acid* alkaline carbonates or bicarbonates, which are not capable of effecting the decomposition of chloral with the formation of chloroform; the long-since discarded theory of Liebreich being thus untenable upon very simple ground. To whatever cause, therefore, the soporific action of chloral may be due, it follows that if chloroform is really produced, other substances of an unknown nature must be brought into action, effecting its decomposition, which, similar to the changes occurring in the assimilation of plants with the production of the complex organic principles, cannot as yet be traced or represented by chemical formulas.—Am. Jour. Phar., April, 1881, p. 151.

Methyl-Alcohol—Detection in Ethyl-Alcohol.—Cazeneuve and Cotton propose the use of permanganate of potassium for this purpose, as it is reduced instantly at ordinary temperature by methylic alcohol, while ethyl alcohol only reduces it very gradually.—Am. Jour. Phar., March, 1881, p. 119; from Chem. Centralbl., January 5th, 1881, p. 11.

Chloride of Methylene—Preparation.—Dr. W. H. Greene, after numerous experiments, has found the best method for preparing methylene chloride to consist in the reduction of an alcoholic solution of chloroform by zinc and hydrochloric acid. The zinc and chloroform (mixed with several times its volume of alcohol) are placed in a flask connected with a suitable condensing apparatus, and hydrochloric acid is added in small portions. The reaction develops considerable heat, and methylene chloride and chloroform distil over; when the reaction has somewhat subsided, and no more liquid distils, more hydrochloric acid is added, and a moderate heat applied if necessary. In any case, the mixture is heated towards the close of the operation, until alcohol begins to distil in quantity. The operation is then arrested, and the product in the receiver washed, dried, and rectified, that portion which passes below about 53° C. being retained. The residue is returned to the flask, and again submitted to the action of the zinc and hydrochloric acid. The yield was thus brought up to about 20 per cent. of the chloroform employed. By several careful rectifications of the product passing below 53° C., pure methylene chloride, boiling at 40°–41° C., is obtained. From methylene chloride the author prepares

Dioxyethyl-methylene by gradually introducing one molecule of sodium into a mixture of one molecule of methylene chloride and about four times the theoretical quantity of absolute alcohol, contained in a flask connected with a reflux condenser. After all the sodium has been introduced, the mixture is heated on a water-bath for about an hour, and is then distilled. The distillate is fractioned, and the portion which passes below 78° C. contains all the diethyl ether. It is agitated with a tolerably concentrated solution of chloride of calcium, and carefully rectified, that portion being retained which passes between 86° and 89° C. Dioxyethyl-methylene, so obtained, is an ethereal liquid, having a penetrating, pleasant odor, somewhat recalling that of mint. Its specific gravity at 0° C. is 0.851, and it boils at 89° C., under a pressure of 769 millimeters. It is slightly soluble in water, from which it may be separated by the addition of chloride of calcium; it mixes in all proportions with ether and alcohol, and cannot readily be separated from its alcoholic solutions if much alcohol be present; in such a case, fractional distillation, and treatment of the portion which passes below 78° C., with solution of chloride of calcium, effects the separation.—Chem. News, July 2d, 1880, p. 7; from Jour. Amer. Chem. Soc.

Nitrite of Amyl—Preparation.—The following convenient and practical method for the preparation of nitrite of amyl is recommended by Ad. Nietsch: 10 parts of pure amylic alcohol and 12 parts of concentrated sulphuric acid are mixed and set aside for twenty-four hours; a solution of 10 parts of nitrite of potassium in 20 parts of distilled water is then added, the mixture well shaken, if necessary, cooled, and again set aside in a loosely-stoppered bottle, so that the vapors formed may escape in the open air. The liquid formed upon the surface is now carefully removed, washed with water containing a little caustic alkali, but observing that it shall not be in excess. It is, after this, dehydrated by chloride of calcium, and rectified by distillation, the first portion, containing free nitrous acid, being rejected. —D. A. Apothek. Ztg., July 15, 1880, p. 8.

Allyl Alcohol—Compound with Baryta.—C. Vincent and Delachanal have observed that when allyl alcohol is dried over anhydrous baryta, as is generally recommended, a very large loss of alcohol results. This, they find, is due to the formation of a compound of the alcohol with baryta. The alcoholic liquid treated with baryta leaves on evaporation a mass of microscopic crystals, which are mainly composed of the compound $2C_3H_6O,BaO$. The barium allylate, as follows from its production, is soluble in allyl alcohol, but from such solution is obtained in the form of an amorphous mass, which dries with difficulty at the ordinary temperature. In a vacuum at 100° C., however, the allylate becomes perfectly dry, and has then acquired the property of decomposing rapidly on a slight elevation of temperature, leaving a pulverulent and very voluminous carbonaceous residue.—Jour. Chem. Soc., November, 1880, p. 794; from Compt. Rend., 90, pp. 1360, 1361.

Carbolic Acid—Cause of Reddening.—Mr. Ed. Fabini concludes from his experiments that the reddening of carbolic acid, caused by ammonia,—as previously observed by Dr. H. Hager,—is primarily due to the presence of traces of copper, which latter is probably derived from the traces of copper contained in the coating of tinned-iron vessels, in which the acid is usually brought into the market. Even very minute traces of copper appear to be sufficient to produce this result. —New Rem., June, 1881, p. 171; from Pharm. Post and Pharm. Zeit., 1880, No. 101.

Chlorophenols—Disinfecting Power.—C. O. Cech, by treating phenol with chlorine gas, obtained a red crystalline mass, from which, by pressure, white crystals are obtainable. These consist of a mixture of three chlorophenols, in which trichlorophenol predominates, and is probably the most useful. These chlorophenols present the advantage over phenol, for bandages, etc., in being less corrosive and poisonous. Their exact value in this direction remains, however, to be determined by further experiments.—Phar. Jour. Trans., June 11th, 1881, p. 1028; from J. f. pr. Chem.

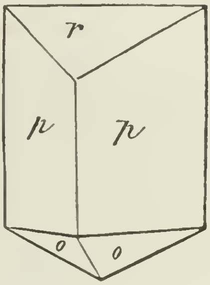
Resorcin—Antiseptic Value and Therapeutic Uses.—This phenol, discovered by Hlasiwetz and Barth, is now produced very cheaply, and has attracted some attention as an antiseptic and therapeutic agent. Dr. Justus Andeer has found that it requires rather strong solutions of resorcin to arrest fermentation; but a 1 per cent. solution will prevent the decomposition of urine, even if exposed to the air for months, and is an energetic destroyer of the organic germs of putrefaction. Resorcin is not absorbed by the healthy unwounded skin, and does not produce symptoms of irritation or relaxation, even when violently rubbed into it. A 1 per cent. solution prevents the decomposition of pancreas, blood, urine, and other easily putrescible substances; soon arrests already existing decomposition; acts without local or constitutional effect, just as well as carbolic acid in septic process, and, even in 2 per cent. solution, has as little effect upon the healthy skin or mucous membrane as pure water. It is borne as well or better than any other antiseptic, particularly by the organs of respiration, which it does not in the least irritate.

Resorcin is valuable in surgery in general, and in dental practice especially. It is also valuable as a caustic for catarrhal, tubercular, and syphilitic sores, in which cases it is best used in form of crystals applied to excrescences, particularly on mucous membranes. In form of powder or crystal it is a most efficient remedy in diphtheritic affections. The most difficult cases of this disease were cured by Dr. Andeer, in at most one week, completely and without injurious consequences. The usual dose is 1 to 2 grams (15 to 30 grains), which may be given in mixture, emulsion, or powder inclosed in gelatin capsule or wafer; the average maximum dose is 5 grams (75 grains).

The following, regarding the characters of resorcin, may properly find a place here. Resorcin forms tabular, prismatic (orthorhombic) crystals, which, when rubbed or struck in the dark, appear phosphorescent. Its melting-point is variously stated at 99°, 104°, and 118° C.; its boiling-point at 276.5° and 300° C. At 300° C. it is decomposed. Its specific gravity, at 0° C., is 1.2727. 100 parts of water dissolve about 86.4 parts of resorcin, which is easily soluble in all liquids excepting chloroform and disulphide of carbon.—New Rem., September and October, 1880, pp. 269 and 291.

Professor F. B. Power, in view of the recent introduction and application of resorcin in medicine and surgery, contributes a brief résumé of its history, methods of formation, chemical characters, and application. It was first obtained by the action of melting caustic potassa upon galbanum resin, and was afterwards obtained in a similar manner from ammoniacum, asafœtida, sagapenum, acaroid, and other resins. Since the more exact determination of its chemical characters and constitution, however, these methods of formation have been superseded by its direct production from other closely related benzol derivatives, such as meta-chlor- or meta-brom-benzol-sulphuric acid, meta-chlor- and meta-iodophenol, and phenol-meta-sulphuric acid, or their potassium salts, by fusion with caustic potassa. The most reasonable and best method for its formation, however, and that which is now technically employed, is from the benzol-disulphonic acid (formed by the action of fuming sulphuric acid upon benzol), preparing from this the potassium salt, and fusing this with caustic potassa, whereby it is resolved into resorcin and sulphite of potassium. —Am. Jour. Phar., May, 1881, pp. 221–225.

FIG. 91.



Crystal of Resorcin.

Glycerin—Specific Gravity and Percentage.—Dr. Wilhelm Lenz has subjected the specific gravities of glycerin, of various percentages, to a critical examination, in order to replace the discordant percentage tables of previous experimenters by one more reliable. For this purpose he chose an entirely new method, namely, the quantitative determination of *carbon*, by ultimate analysis, in the various dilutions of glycerin.

From these data he has constructed a table of specific gravities, from which we abstract the numbers ending in 5 and 0 only:

Anhydrous Glycerin.	Spec. Grav.	Anhydrous Glycerin.	Spec. Grav.
100 per cent.	1.2691	50 per cent.	1.1320
95 "	1.2581	45 "	1.1183
90 "	1.2425	40 "	1.1045
85 "	1.2292	35 "	1.0907
80 "	1.2152	30 "	1.0798
75 "	1.2016	25 "	1.0635
70 "	1.1889	20 "	1.0498
65 "	1.1733	15 "	1.0374
60 "	1.1582	10 "	1.0245
55 "	1.1455	5 "	1.0123

—New Rem., November, 1880, p. 324; from Zeitschr. f. Anal. Chem., 1880, p. 297.

Glycerin—Absorption of Moisture.—Mr. George Eli Williams has made the following experiments to determine the rapidity, under different circumstances, with which glycerin will absorb moisture:

1. 100 grams of glycerin, specific gravity 1.25, were placed in each of four vessels of about the capacity of 200 cc., and of the diameter given in the table. These vessels were placed in the damp atmosphere of the cellar, September 1st, and weighed monthly.

	Weight.				Monthly Increase.				
Diameter.	Oct. 1.	Nov. 1.	Dec. 1.	Jan. 1.	Oct.	Nov.	Dec.	Jan.	
2.5 cm.	102 gm.	103.7 gm.	103.8 gm.	104.1 gm.	2.0	1.7	.1	.3	per cent.
5.0 "	116 "	118.0 "	119.25 "	122.0 "	16.0	2.0	1.25	2.75	"
7.5 "	135 "	138.5 "	142.7 "	147.5 "	35.0	3.5	4.2	4.8	"
10.0 "	150 "	152.7 "	155.25 "	158.5 "	50.0	2.7	3.25	3.25	"

2. 100 grams of glycerin, specific gravity 1.25, and 100 grams of distilled water were each put into a vessel 5 cm. in diameter and of 200 cc. capacity, and the two placed in a large jar, which was closely covered. The vessels were weighed monthly, and showed the following gains and losses respectively:

Glycerin gained in October 8 per cent.; November, 4 per cent.; December, 2 per cent.; January, 1.7 per cent.

Water lost in October 10 per cent.; November, 7.5 per cent.; December, 7 per cent.; January, 7.2 per cent.

—Am. Jour. Phar., October, 1880, p. 485.

Glycerin—Improved Process of Assay.—Mr. Friedrich Clausnizer, in a paper on the assay of glycerin in beer, after discussing the different methods heretofore proposed, and pointing out their various sources of error, recommends certain modifications in the above process, and advises the employment of a displacement apparatus for the more complete extraction of the glycerin from the mass. The details of the process are as follows:

50 cc. of the liquid (beer, etc.) are warmed in a tared capsule with glass rod. As soon as any carbonic acid gas present has escaped, about 3 grams of slaked lime are added, the whole evaporated to a syrupy consistence, and, after the addition of about 10 grams of coarsely-powdered marble, and under repeated stirring and breaking-up of lumps, completely dried, until the residue is hard. The capsule is again weighed, its contents reduced to powder, and a weighed portion of it ($\frac{2}{3}$ to $\frac{3}{4}$) extracted in a displacement apparatus, with 20 cc. of 90 per cent. alcohol, during four to six hours. The alcoholic extract, amounting to about 15 cc., is allowed to cool, and afterwards treated with 25 cc. of anhydrous ether. The insoluble matter is allowed to subside, by setting aside for one hour, the liquid passed through a small filter into a small weighed flask, and the residue, with filter, washed with a mixture of absolute alcohol and ether (2:3). The almost colorless filtrate is deprived of the volatile menstruum by gently warming the flask, in an inclined position, on the water-bath.

Finally, the residuary glycerin is dried, in the lightly-covered flask, between 100° and 110° C., for about two hours, and until it loses no more than 2 milligrams between two successive weighings. In ordinary cases, two to four hours of drying are required; when much glycerin was present, four to six hours. Since the menstruum employed is apt to dissolve minute quantities of saline bodies, the latter may be determined when great accuracy is required. For this purpose, the residuary glycerin is treated with a little water, the solution transferred to a weighed platinum capsule, evaporated, and the residue dried and ignited. The extraction apparatus recommended by Mr. Clausnizer is a modification of a familiar form, based upon the principle of the intermittent fountain, and is fully described and illustrated in New Rem., April, 1881, p. 107; from Zeitschr. f. Anal. Chem., 1881, p. 8.

Glycerin—New Reagent.—It is well known that 2 drops of carbolic acid, even in $\frac{1}{4000}$ to $\frac{1}{5000}$ dilution, gives with 1 drop of ferric chloride a distinct blue color, which disappears, however, on the addition of 6 to 8 drops of glycerin, or does not appear at all if the glycerin is present in the liquid. C. Barbsche applies this property of glycerin to its detection, remarking that when the liquid is very dilute, or when large quantities of sugar or extractive matter are present, in fact, when the liquid is much colored, the liquid must be carefully evaporated in the water-bath, extracted with ether-alcohol, and the residue of evaporation from this again dissolved in water before applying the test. If the liquid is alkaline, it is slightly acidulated.—Chem. Ztg., March 17th, 1881, p. 183; from D. A. Apoth. Ztg., 1881, p. 22.

FIXED OILS, ETC.

Olive Oil—Detection of Adulteration with Seed Oils.—Referring to the import of large quantities of cotton-seed oil into Italy, Mr. Michael Conroy states that, from inquiries he has made, he learns that most of the cotton-seed oil (large quantities of which are shipped to Italy from Liverpool) is used by the poorer Italians for cooking and other domestic purposes, instead of the more valuable production of the olive, and that it is also chiefly used for tinning sardines. That much of it is thus used there can be no reasonable doubt, but it is nevertheless well known that it is largely used for the adulteration of olive oil. Unfortunately the published tests for its detection are very defective. After reviewing these, the author advises the following as most reliable, which is a modification of the nitric acid test used by many oil merchants. In this test the guide usually accepted is the consistency, but in the author's modification the guide is the color. It is as follows:

Mix thoroughly *one* part of strong nitric acid (specific gravity 1.42) with *nine* parts of the oil to be tested, and pour the mixture into a white porcelain dish capable of holding at least ten times the quantity. Apply heat gently, until the action between the oil and acid has fairly set up, then remove the source of heat, and stir well with a glass rod until the action is over. Pure olive oil thus treated, and allowed to cool, sets into a pale straw-colored hard mass in an hour or two, while cotton-seed oil and other seed oils assume a deep orange-red color, and do not set like olive oil. In hot weather it is necessary to artificially cool the sample to promote the setting, but to a practiced eye the setting is quite unnecessary, the color being sufficiently distinct without. Admixture of 5 per cent. can thus be detected, the gradations of color being very regular and constant, so that approximately the quantity of adulterant can be readily determined by comparison with a few mixtures containing definite percentages of seed oil. The only precaution necessary is to observe that the reaction does not become so violent as to cause spurting.—Phar. Jour. Trans., May 14th, 1881, p. 933.

Cotton-seed Oil—Export to, and Uses in, Italy.—Mr. B. O. Duncan, the United States Consul at Naples, writes that cotton-seed oil has found its way into the remotest mountain villages of Italy, whose production is olive oil, where it is mixed with the latter and sold as pure, and so great is the resemblance that even the most expert cannot detect the mixture.—New Rem., March, 1881, p. 86.

Oil of Sesame—Detection of Adulterants.—It is stated, in "Jour. de Pharm. d'Anvers," that this oil is not unfrequently adulterated with cheaper oils, such as cotton-seed, poppy, or mustard oil. These may be detected as follows: Into a test-tube put 10 cc. of the oil, add carefully 4 drops of sulphuric acid, shake briskly for a few minutes, then add 4 drops of nitric acid, and shake again. If the oil is pure, it will acquire a deep-green tint, which rapidly passes into a currant-red; if it is adulterated by any of the above oils, no such coloration will make its appearance.—New Rem., July, 1880, p. 211.

Ethereal Castor Oil.—Bodam has obtained from castor seeds, by treating them with ether, not only the oil which would not be purgative by itself, unless it contained some of the active principle known as *ricinin*, but his solution also contains this in larger proportion. He is thus able to get the purgative effect of the oil by a smaller dose, and without the disagreeable taste of the ordinary oil. His preparation has further the advantage of being miscible, in any proportion, with water, coffee, or milk.—Chem. and Drug., June, 1881, p. 263.

Cod-liver Oil—Ashy Ingredients.—Professor E. A. Vanderburg has determined that light-colored cod-liver oil, when subjected to combustion, may leave a trace of iron but no other ashy ingredients. He is of the opinion, therefore, that the phosphoric acid, calcium, etc., found by Dr. de Jongh, originated from the vessels and reagents that were used. The combustion should always be made in platinum vessels. The author also gives directions for the analysis of iodo-ferrated cod-liver oil.—Phar. Jour. Trans, September 4th, 1880, p. 189.

Butter—Composition.—According to E. Wein, butter contains the following fixed fatty acids: Palmitic, oleic, stearic, myristic, and arachitic, the two latter in small quantities; and the following volatile acids: normal caprylic, capric, normal caproic and butyric. Acetic and formic acids have also been found, but propionic, valeric, œnanthylic, and pelargonic acids could not be detected.—Chem. News, August 6th, 1880, p. 72; from Bull. Soc. Chim.

Chinese White Wax—Collection and Propagation.—The following account of the mode of collecting Chinese white wax is of sufficient interest to find a place in this report: The Chinese white wax is a deposit found on twigs of *Ligustrum lucidum.* and caused by the puncture of an insect. It is said that in the district of Keenchang the plant thrives in great abundance, and in the spring of the year the twigs are covered with countless swarms of flies, having the appearance of a brown film. The branches soon become covered with a white soap-like incrustation, which increases in volume till the commencement of the fall of the year, when the sprays are cut off and immersed in water, which is kept boiling. The viscid substance rises to the surface, and is skimmed off, melted, and allowed to cool in deep pans. It was accidentally discovered, that by transporting the insects from their native districts to the more vigorous one of Keating-fu, in the north of the province, their power of discharging wax was largely augmented—a property which was promptly and extensively availed of by the Sze-chuen traders. The period between evening and morning is chosen for conveyance, because many hours of sunlight would precipitate the hatching. This should take place only after the females have become attached to the trees. Arrived at their destination, six or more of the mothers—which are enormously prolific—are tied, wrapped in a palm leaf, to a branch of the ligustrum. A few days later the young flies are swarming on the twigs, when they fulfil their mission by the month of August; then they perish in the caldrons, where the results are immediately collected. It is stated that this peculiar industry requires the exercise of great care and forethought. The average annual value of this peculiar crop amounts to about £650,000.—Phar. Jour. Trans., October 16th, 1880; from Gardner's Chronicle, October 2d, 1880.

Oleate of Mercury—Preparation.—Mr. Nathan Rosenwasser recommends the preparation of a true oleate of mercury as follows: Oleic acid is heated in a porcelain dish to about 220° F., and *red precipitate* is added in small quantities until 1 part for 2⅗ parts of oleic acid has been added, stirring constantly during the addition. If the oleic acid is not perfectly pure, as is usually the case, a small allowance must be made; that is to say, a slightly larger quantity must be used. The heat should be carefully regulated, and not permitted to rise above 240° F. The solution is poured while hot from a slight sediment that may form from impurity in the red oxide of mercury. From this *true* oleate the 20 per cent. oleate may be prepared by dilution with petroleum ointment, the latter causing it to keep better. From the 20 per cent. oleate, those of a lower percentage are afterwards made extemporaneously, preferably also with a petroleum product. Yellow oxide of mercury is not only much more expensive than the red, but, in the author's opinion, possesses no advantages over the latter in the preparation of the oleate.—Drug. Circ., January, 1881, p. 1; from Proc. Ohio Pharm. Assoc.

Oleate of Bismuth—Preparation.—Mr. C. R. Killick reviews various methods for, and the difficulties encountered in, the production of oleate of bismuth. He appears to prefer the process suggested by Dr. McCall Anderson, modified, however, in that the freshly prepared oxide is washed with spirit, and is used in the moist condition. A definite weight of the nitrate is decomposed by boiling with soda, the oxide is washed with distilled water, and afterwards with spirit to free it from water. The precipitate is transferred to the oleic acid and heated on a water-bath with constant stirring until combined. The oxide thus obtained is much more readily soluble than that which has been dried by means of heat, and the spirit being miscible with oleic acid, offers no obstacle to combination. After becoming solid, the temperature is gradually raised until the oleate liquefies, and the spirit, together with any water which may be liberated during the combination, is driven off. The product, which somewhat resembles oleate of lead, may be made to contain 30 per cent. of the base, and may then be suitably diluted.—Chem. and Drug., April, 1881, p. 167; from Proc. Chemist's Assistant's Association, March, 1881.

CARBOHYDRATES.

Carbohydrates—Determination in Infant's Food.—Dr. N. Gerber proposes the following method: In a capsule of platinum or porcelain, holding 50 cc., are put 2 or 3 grams of the sample, taken from the middle of the package, and mixed with ten times the weight of water. (1.) In food containing diastase proceed according to the direction given upon the package, making use of the thermometer. The mass is allowed to cool, placed in a tall beaker, holding 150 to 200 cc., and the capsule is then washed with 100 cc. alcohol at 50° Tralles. It is allowed to stand over night when the clear liquid is drawn off; the precipitate is transferred to a filter, the beaker rinsed with 100 cc. of alcohol at 50° Tralles, and this is then used to wash the filter. The filtrate is evaporated to quarter of its volume, separated by filtration from the albuminates and fatty matter, and then evaporated, first in the water-bath, and then in the air-bath, at 100° to 110° C., till the weight becomes constant, and weighed. The residue is then carefully incinerated. The capsule and ash subtracted from capsule and solid residue gives the quantity of soluble carbohydrates. (2.) In ordinary foods, 1 part is also mixed with 10 parts of water, kept at a boil for exactly five minutes, and further treated as above.—Chem. News, August 13th, 1880, p. 85; from Corresp. Bl. d. Ver. Anal. Chem., No. 6, 1880.

Explosive Cotton—Improved Method of Preparation.—It is stated by R. Böttger, in "Polyt. Nolizbl.," 1880, No. 18, that it is better, after removing the cotton from the mixture of acids. to remove the acid superficially, and to expose it in that condition for several days, than to remove the acid at once by immersing it into a large quantity of water. After that it is washed and freed from acid as usual.—Phar. Centralh., November 4th, 1881, p. 401.

Soluble Starch—Preparation by means of Glycerin.—Mr. K. Zulkowsky has found that if starch is heated with glycerin to 190° C. (=374° F.), and then poured into water, the latter retains all the starch which has been rendered soluble, while the insoluble portion subsides. He directs to mix intimately about 60 grams of starch with 1 kilo of concentrated glycerin, in a porcelain capsule, and to heat, under constant stirring. At first the starch-cells swell up; after awhile vapor of water is given off, and, when the temperature has reached about 130° C. (=266° F.), the mass becomes so thick that it is difficult to stir. It now appears as a tough, transparent substance. On further heating, the consistence becomes softer, and at about 170° C. (=338° F.) the whole appears thin fluid. The starch is now in solution, and the bottom of the capsule may be plainly seen through the liquid. If the heat is raised to 190° C. (=374° F.), until dense vapors are given off from the glycerin, the starch has been converted, more or less, into the soluble modification. On allowing the glycerin solution to cool, the mass becomes more dense. If it be poured, while hot, into water, any starch which has remained insoluble separates as jelly or paste, and from the filtrate the soluble modification may be obtained by precipitation with alcohol. The above shows that both modifications are soluble in glycerin.—Ber. D. Chem. Ges.; New Rem., March, 1881, p. 81.

Malto-dextrin—Formation.—Experiments on the saccharification of starch by means of diastase having raised some doubts respecting the formulas of the products formed, A. Herzfeld instituted some experiments in order to obtain further information on the subject. The results of his labors show that saccharification of starch by diastase always produces dextrin through the series of amylo-, erythro-, and achroo-dextrin; at the same time a part of the achroo-dextrin is transformed into malto-dextrin and maltose. This transformation takes place within certain limits. The absence of a sufficient quantity of sugar arrests the process, which is, however, resumed when the fermentation is allowed to proceed in the produced sugar. The temperature must be under 65° C.; if higher, and up to 80° C., the diastase operates only as far as the erythro- and malto-dextrin stage, it being uncertain if achroo-dextrin and maltose will be produced. These conclusions coincide with those of Payen, by whom, however, malto-dextrin was only considered a transition product. The view of Musculus, that the starch molecule splits up into sugar on the one side and dextrin on the other, finds further refutation in these experiments.—Jour. Chem. Soc., December, 1880, p. 866; from Bied. Centr., 1880, pp. 347–350.

Inulin—Characters and Relations.—Kiliani has subjected inulin to careful research and study. He concludes that it stands in the most intimate relation to levulose, of which it appears to be the anhydride, and into which it passes with such facility, that in all reactions which require a long warming with water, or need the presence of dilute acids, the inulin is replaced by levulose. Inulin is distinguished sharply from levulose in that it neither reduces Fehling's test nor undergoes fermentation. Moreover, it does not form hydrogen addition products. Its hydrate, levulose, differs from dextrose in its oxidation products; the latter affording, when oxidized with nitric acid or bromine and water, compounds which contain six carbon-atoms,—saccharic (perhaps gluconic) acid; while levulose similarly treated affords bodies with a less content of carbon,—glycolic and oxalic acids. This the author explains by supposing dextrose to be the aldehyde of mannite and levulose its ketone.—Am. Jour. Phar., April, 1881, p. 188, and Amer. Jour. Sci., February, 1881; from Liebig's Annal, 205, p. 145.

Cane-sugar—Presence and Detection of Glucose.—Mr. P. Casamajar draws attention to the presence of considerable quantities of glucose (starch-sugar) in powdered sugar. A sample examined by him contained 20 per cent. of the adulterant. The glucose can accurately be determined only by optical or chemical methods, but very good practical methods are the following:

1. The suspected sugar is mixed with a little less than its weight of cold water and stirred a few seconds. If starch-sugar is present it will float in the solution in form of white flocks or granules. The test

is best made in a beaker, and is very reliable. Undissolved cane-sugar settles more rapidly, and, being more transparent, is not so readily noticed.

2. A small piece of *pure* cane-sugar is placed upon the tongue; as soon as it is consumed, and while the taste still remains, some of the suspected sugar is placed on the tongue, when, in the presence of starch-sugar, its peculiar bitter-sweet taste becomes apparent.—D. A. Apothek. Ztg., October 15th, 1880, p. 4.

Cane-sugar—Recovery from Molasses by Fermentation.—It is found that pure *Mucor circinelloïdes* ferment only attacks the directly fermentable sugars or glucosès, not affecting the saccharoses, and, moreover, that it is a more powerful ferment than the ordinary beer ferment; but, unlike yeast, it cannot produce fermentation unless there is a sufficient supply of nourishment for its propagation. U. Gayon observes that this fact will be of great service to the sugar industries, in that the cane-sugar can now easily be obtained from the molasses as follows: The molasses should be diluted until the glucose is present to the amount of not more than 10 per cent; the glucose may then be fermented by means of *M. circinelloïdes*, which does not act on the saccharose, and the action is not retarded by even 30 per cent. of saccharose. The fermentation must be preceded by heating the molasses to boiling, and allowing it to cool in closed vessels; the most advantageous temperature is 35° C. to 40° C. Care must be taken that only the mucor ferment is present, but it may be used repeatedly for several operations.—Jour. Chem. Soc., June, 1881, p. 480; from Bied. Centr., 1880, pp. 835–838.

Beet-sugar—Inversion for Wine.—W. Eugling used sulphuric, phosphoric, and tartaric acids in the inversion of beet-sugar. Sulphuric acid was found the quickest and tartaric acid the slowest in its operation. The inverted sugars were used for the preparation of "after-wine," being mixed with pressed grapes and allowed to ferment. The best wine was obtained from the sugar inverted by means of phosphoric acid.—Jour. Chem. Soc., November, 1880, p. 833; from Bied. Centr., 1880, p. 486.

Palm-sugar—Components.—Horsin-Déon has examined palm-sugar from Calcutta, with the following results: Cane-sugar, 87.97; reducing sugar, 1.71; gum, 4.88; water and volatile constituents, 1.88; ash, 0.50; mannite and loss, 3.06. The sugar was fermenting.—Jour. Chem. Soc., December, 1880, p. 863; from Dingl. Polyt. Jour., 237, p. 146.

Ferrous Sucro-carbonate—A New Crystalline Compound.—Mr. C. Tanret has found that when "*masse de Vallet*" is made with cane-sugar, a syrupy mass interspersed with crystals is obtained. These crystals are of a brown color and opaque; the angle between the lateral faces is 79.40°; specific gravity = 1.85. They are decomposed by the neutral solvents of sugar, the sugar going into solution and ferrous carbonate being precipitated. The sugar acts but faintly on Fehling's solution until heated with acid. The analysis of the crystals corresponds with the formula $(C_{12}H_{22}O_{11})_3(Fe_2O_3)_2$.—Phar. Jour. Trans., April 30th, 1881, p. 901; Jour. de Pharm., and Jour. Chem. Soc., April, 1881.

Glucose—Volumetric Estimation.—F. W. Pavy draws attention to the estimation of sugar by Fehling's solution, to which ammonia has been added, whereby reduction is obtained without precipitation, the indication being the decolorization of the solution. When the solution is prepared in this way, it is found that one atom of sugar reduces six atoms of cupric oxide instead of five. When, however, caustic potash, in the proportion of 5 grams to 20 cc. of the ammoniacal test (one-tenth of Fehling's solution), was added, the amount of copper reduced was brought back to the normal five atoms.—Jour. Chem. Soc., July, 1880, p. 512; from Proc. Roy. Soc., 28, p. 260.

Battandier recommends the above solution for the more accurate determination of glucose in urine. It is prepared by him as follows: 100 cc. of Fehling's solution are treated with 250 cc. of ammonia, and the mixture made up to a liter. 200 cc. of this solution (= 0.10 grain (gram?) glucose) are put in a flask provided with a cork, in which two tubes are inserted; one is connected with a Mohr's burette containing the urine, the other allows access to the air. The contents of the flask are brought to boiling, and the urine added drop by drop from the burette until the color of the solution disappears.—Ibid., from Jour. de Phar. et Chim. (5), 1, pp. 221, 222.

Levulose—Compound with Lime.—According to E. Peligot, in order to obtain the lime compound of levulose in a state of purity, a 6 or 8 per cent. solution of inverted sugar is mixed with milk of lime, the liquor quickly filtered and cooled to 0° C., when the so-called calcium levulosate crystallizes out in abundance. The crystals must be washed quickly to prevent the absorption of carbonic acid, and dried in a vacuum. 100 parts of water at 15° C. dissolves 0.73 parts of the salt, producing a solution which is exceedingly prone to alteration, its alkaline reaction becoming gradually weaker, and its amber-yellow color passing to deep brown. When boiled, the solution quickly becomes neutral, and a precipitate is obtained similar to that which appears always to accompany the formation of glucic acid. The analysis of the pure yellowish-white lime compound, dried in a vacuum, leads to the formula $C_6H_{12}O_6,CaO,H_2O$. By means of calcium levulosate and oxalic acid, a solution of pure levulose can be prepared, but all attempts to induce this solution to crystallize have hitherto proved unsuccessful.—Jour. Chem. Soc., August, 1880, p, 539; from Compt. Rend., 90, pp. 153–156.

Levulinic Acid—Formation from Different Sugars.—B. Tollens, who described several years ago the formation of levulinic acid from levulose, or fruit sugar, has studied more fully the conditions of its formation, and has shown that it can be formed, although with greater difficulty, and in relatively smaller amount, from both dextrose and grape-sugar, and from milk-sugar. He also shows that this acid, derived from the sugars by the action of dilute sulphuric acid upon them, and possessing the formula $C_5H_8O_3$, is *acetopropionic acid*, and in proof of this he has changed it into normal valerianic acid. Of the latter a series of metallic salts and ethers were formed, which were found to agree with those generally known.—Am. Jour. Phar., April, 1881, p. 171; from Liebig's Annalen, 206, p. 217.

Anhydrous Milk-sugar.—Mr. Schmöger states that on evaporating a solution of milk-sugar at 100° C., until it becomes completely dry, it is obtained in an anhydrous state, and not, as has been supposed heretofore, in combination with 1 molecule of water. This new fact will be of some importance in quantitative determinations of milk-sugar.—New Rem., March, 1881, p. 84; from Ber. d. Deutsch. Chem. Ges., 1880, p. 1915.

Milk-sugar—Laxative Properties.—According to Dr. Taube milk-sugar is not only a pleasant but a very effective laxative. It is taken in the morning before eating, in doses of 9–15 grams (3 to 5 teaspoonfuls), dissolved in ¼ liter of warm milk which has been previously skimmed and boiled. A good action follows in from two to three hours.—Phar. Centralh., March 31st, 1881, p. 147; from Deutsche Med. W., 1881, No. 9.

Arabinose—Identity with Lactose.—H. Kiliani has made a careful study of the arabinose of gum arabic, and proves its identity with lactose or milk-sugar. For its extraction 1 part of pure gum arabic was boiled for some eighteen hours with 8 parts of 2 per cent. sulphuric acid, replacing the evaporated water from time to time. The liquid, after neutralization with barium hydrate and filtration from sulphate of barium, was evaporated to syrup and extracted with 90 per cent. alcohol as long as anything was taken up. This alcoholic solution yielded a reddish colored syrup, which was placed over sulphuric acid and allowed to crystallize. The crystals, when purified by repeated crystallization out of alcohol, were quite difficultly soluble in that menstruum. Its identity with lactose is well established by its relation to Fehling's solution, to ferments, to sodium amalgam, and its optical properties. The author proposes that the name arabinose be therefore dropped, and that it be simply called lactose.—Am. Jour. Phar., March, 1881, p. 120; from Ber. d. Chem. Ges., xiii, p. 2304.

Mannite—Preparation by Dialysis.—Mr. Louis Genois has prepared mannite as follows: Five troy ounces of manna were dissolved in 20 fluid ounces of distilled water by the aid of heat; the solution was allowed to cool, filtered, heated to 170° F., and poured into the dialyser, immersed in 12 fluid ounces of distilled water also heated to the same temperature, and set aside. The dialysate was removed after twenty-four hours, replaced by 12 fluid ounces of water, heated to 170° F., and again set aside; this was repeated a second time, the contents of the dialyser being also heated to the same temperature. The resulting solutions were mixed, concentrated at a gentle heat, filtered, and evaporated to a syrupy consistence, and while still hot poured into three volumes of cold 85 per cent. alcohol and allowed to rest for twenty-four hours. The slightly colored crystals were redissolved in warm water, the solution filtered through animal charcoal, reduced to syrup, poured into alcohol as before, and allowed to rest. The crystals now formed were purified by solution in hot alcohol, filtration, and evaporation. In this manner large flake manna yielded 65 per cent., small flake manna 26 per cent., and sorts manna 17 per cent. The latter formed a very viscid solution with water, which would not dialyse with facility until it had been shaken with some coarsely ground litharge, when it proceeded satisfactorily.—Am. Jour. Phar., May, 1881, p. 232.

ORGANIC ACIDS.

Anhydrous Oxalic Acid—Crystallization.—A. Villiers describes the preparation of anhydrous oxalic acid: 1 part of ordinary acid is dissolved in about 12 parts of warm concentrated sulphuric acid, and the solution is allowed to stand several days. The anhydrous acid is deposited in remarkably transparent voluminous crystals of the form of octahedra, with a rhombic base, generally modified by the face *p* of the primary prism, with a cleavage parallel to this face. When exposed to the air the crystals take up 2 molecules of water and fall to powder.—Am. Jour. Phar., October, 1880, p. 494; from Jour. Chem. Soc., August, 1880, p. 544.

Ferric Succinate—Solubility.—It is stated in textbooks ("Fresenius's Qualitative Analysis," "Gmelin's Handbook," etc.) that unless the precipitation of a neutral ferric salt by succinate of ammonium be conducted in the cold, owing to the liberation of free succinic acid, which does not exert any solvent action in the cold, a certain amount of the precipitate is redissolved. Mr. Sydney Young has now made some experiments to test the accuracy of these statements, the details of which need not be given, but which show clearly that the tedious method of precipitating in the cold is quite unnecessary, and that even less iron remains in solution when boiling is resorted to than in the cold. A considerable amount of time is saved by using a boiling solution, because the precipitate then settles readily, especially after boiling for two or three minutes, and is easily and quickly filtered and washed; moreover, the precipitate then never passes through the filter-paper, as not unfrequently happens when a cold solution is used. Mr. Young's experiments refer directly to their analytical application, but bear equally upon the production of the compound for medicinal and other purposes.—Jour. Chem. Soc., October, 1880, pp. 674–676.

Lactate of Zinc—Preparation.—Mr. J. F. Brown recommends the following convenient and expeditious process for making lactate of zinc, which appears to be very useful in an emergency:

A quarter of an ounce, by weight, of syrupy lactic acid is neutralized with strong solution of ammonia. This solution is poured into one of 287 grains of pure sulphate of zinc in ½ an ounce of water and stirred for a few seconds. Crystals will form at once, and, after standing for twelve hours, they are washed twice with 1 ounce of water, drained, and dried upon a porous tile. In this way the author obtained a product which was superior to that supplied in the market.—Phar. Jour. Trans., June 4th, 1881, p. 1003.

Benzoic Acid—Preparation from Benzotrichloride.—A writer in "Dingl. Polyt. Jour." (239, 157), gives the following method for producing benzoic acid from benzotrichloride: 3 molecules of acetic acid with a few per cent. of chloride of zinc are warmed on a water-bath, and 1 molecule of benzotrichloride is added; hydrochloric acid and acetic chloride escape, whilst the residue consists of benzoic acid and chloride of zinc. If acetate of zinc is used instead of chloride of zinc acetic anhydride may be produced instead of acetic chloride; but this method is not very practical, as, owing to the violence of the reaction, the benzoic acid is obtained in the form of benzo-acetic acid, which is subsequently converted into benzoic acid. Anhydrous acetate of zinc can be used with advantage, instead of chloride of zinc, at the beginning of the process. Other organic acids—formic or oxalic—can be used instead of acetic acid; but the latter acts with less power.—Jour. Chem. Soc., June, 1881, p. 423.

Benzoic Acid—Excipient for Making Pills.—Mr. R. F. Fairthorne mentions the difficulty of some pharmacists to find a suitable excipient for making benzoic acid into pills, and recommends *two*, either of which will make a good pill mass with the acid. These are: Balsam of fir, a few drops of which will make a plastic mass with a drachm of benzoic acid; and castile soap, of which 1 grain, with a little water, is required for 7 grains of the acid to effect the same purpose.—Am. Jour. Phar., August, 1880, p. 406.

Benzoate of Calcium—Preparation.—Mr. James T. Shinn gives the following formula for benzoate of calcium: Mix 1952 grains of benzoic acid with 800 grains of precipitated chalk in a large mortar and gradually add some water; when effervescence ceases, transfer to a porcelain dish, and add sufficient boiling-water to make 4 pints and to dissolve all the benzoate formed. Filter from the slight excess of carbonate of calcium while hot and set aside to crystallize. The mother-liquors yield a further quantity of crystals, the whole product being ℥iv, ʒv.—Am. Jour. Phar., April, 1881, p. 154.

Salicylates.—Professor Prosser James reviews the salicylates of ammonium, potassium, lithium, calcium, quinia, and cinchonidia, in their physiological relations and effects, for which see "New Rem.," May, 1881, p. 135.

Salicylate of Sodium—Characters and Tests of Quality.—Dr. Geissler draws attention to the inferiority of some specimens of salicylate of sodium, and gives the following simple tests of good quality:

Broad strips of blue and red litmus-paper are placed upon a clean plate of glass, moistened with distilled water, and sprinkled with the sample under examination. Under these conditions the red paper should not show blue spots or stripes, whilst the blue paper must show a red reaction. Salicylate of sodium of good quality should form a clear solution in water and alcohol, should have faint acid reaction. and, under the microscope, should appear in form of pearly glistening transparent scales. The amorphous article need, however, not be rejected if it in other respects conforms to the above tests of quality. —Phar. Centralh., June 9th, 1881, p. 243.

Salicylate of Calcium—Remedial Application.—Dr. Alex. Hutchins recommends salicylate of calcium, prepared extemporaneously as below, in the serous diarrhœa of children.

1. Mix 11 parts of salicylic acid with 4 parts of prepared chalk, and give 3 to 5 grains every two, three, or four hours. Each powder should be thoroughly mixed with a teaspoonful of sugar, a few drops of water being added until the powder and sugar are fully moistened, and then water added to render the mixture sufficiently thin to be swallowed.

2. Mix 30 grains of salicylic acid, 10 grains of prepared chalk, and 2 fluid drachms of simple syrup with sufficient water to make 2 fluid ounces; shake well, and give two teaspoonfuls every two, three, or four hours.—New Rem., December, 1880, p. 372; from Proc. Med. Soc. of Co. of Kings.

Salicylate of Iron—Preparation in Form of Solution.—Dr. J. Walls White observes that salicylate of iron, in the dry state, is a reddish-brown powder, very insoluble, and with difficulty manipulated; but if prepared by the following formula an elegant solution is easily obtained: Take of sulphate of iron, 24 grains; salicylate of sodium, 30 grains; acetate of sodium, 20 grains; water, 1 ounce. Dissolve. In this case the salicylate of iron seems to be in the state of a protosalt. The solution has at first a pale port-wine color, which, on lengthened exposure to the air, gradually deepens, and a precipitate of what seems to be a persalt of iron is apt to deposit. It seems to combine the astringent powers of the iron, but in a minor degree to the sulphate or perchloride, with the antiseptic and antipyretic powers of the salicylic acid.—Drug. Circ., January, 1880, p. 3; from Glasgow Med. Jour.

Meconic Acid—Characters.—Meconic acid is commonly taken as an example of a *tribasic* acid, the silver salts especially being instanced as proving from their composition the fact of its tribasicity. Mr. D. B. Dott has now prepared both the silver and lead salts, and has analyzed them with results which do not bear out the conclusions generally accepted. They appear to have no definite composition, but are, on the contrary, very variable, no two precipitates containing the same percentage of base, and none attaining, in the case of silver, the percentage required by the triargentic salt. The author, however, expresses the opinion that the evidence is in favor of the *dibasic* nature of meconic acid.—Phar. Jour. Trans., January 15th, 1881, p. 576.

Meconic Acid—Formation of Double Salts.—Mr. E. H. Rennie has prepared some double salts of this acid. The double salt of calcium and iron (probably $(C_7H_7O)_4Fe_2Ca_3,5H_2O$) is obtained when chloride of calcium is first added in considerable quantity to a solution of meconic acid, and then a small quantity of ferric chloride; a red precipitate is produced, the supernatant liquid remaining colorless. Similar compounds are produced with barium and strontium. They are slightly soluble in cold, more so in boiling water, and separate out from the latter in an amorphous condition. Their solutions give no precipitate with ammonia, and no blue coloration with ferrocyanide of potassium, but, after the addition of an acid, a brownish tint, indicative of a ferrous salt.—Jour. Chem. Soc., June, 1881, p. 418; from Chem. News, 42, p. 75.

Malonic Acid—Preparation.—E. Bourgoin gives the following directions for the preparation of malonic acid: 100 grams of monochloracetic acid are dissolved in their own weight of water and saturated with carbonate of potassium, 71 grams of cyanide of potassium are then added, and the whole is carefully heated on a water-bath; a brisk ebullition, attended by a considerable evolution of heat, ensues, but the liquid remains perfectly colorless. To this solution twice its volume of strong hydrochloric acid is added, the chloride of potassium, which separates, is removed, and the whole is then saturated with hydrochloric acid gas; the chloride of potassium and sal-ammoniac are again separated, washed with hydrochloric acid, and the liquid is evaporated nearly to dryness on a water-bath; the residue is exhausted with ether and the ethereal solution distilled, when about 70 grams of perfectly pure malonic acid is obtained. The mother-liquors may be made to yield about 20 grams more, which requires recrystallization to purify. Although a small quantity of acetic acid is formed, the yield is almost theoretical.—Jour. Chem. Soc., November, 1880, p. 801; from Compt. Rend., 90, pp. 1289–1291.

Tartaric Acid—Preparation from the Mother-waters.—Hitherto the residuary tartaric acid left in the mother-waters after crystallization has generally been a complete loss, although the quantity may amount to 400 to 500 grams per liter. Mr. Franz Dietrich has now devised the following process for its recovery: The mother-liquid is diluted to 20° to 25° B., about nine-tenths of the free sulphuric acid contained in it is neutralized with lime or chalk, and the filtered solution poured, under constant stirring, in a solution of tartrate of potassium of 15° to 20° B. This causes a precipitation of bitartrate of potassium, containing 90 to 99 per cent. of pure salt. The supernatant liquid contains tartrate of potassium, which is used over again in the next operation, while the cream of tartar, after washing, is decomposed in the usual way.—New Rem., August, 1880, p. 246; from Chemiker Zeitg., No. 21.

Tartaric Acid—New Reaction.—Mr. H. J. H. Fenton proposes the following new reaction of tartaric acid, whereby it may be distinguished from citric and other acids:

The reaction is brought about by adding to a solution of tartaric acid, or alkaline tartrate, a small quantity of ferrous sulphate, or chloride, followed by one or two drops of hydrogen peroxide, and finally an excess of caustic potash or soda. A beautiful violet color is thus obtained. which in very strong solutions appears almost black. At first sight it seemed probable that this color was due to the formation of an alkaline ferrate. This explanation, however, is not supported by later experiments. The color, for instance, is readily destroyed by chlorine, or hypochlorites, in an alkaline solution, which is not the case with ferrates. Moreover, if to the violet solution ferrocyanide of potassium be added, and the liquid be slightly acidulated with dilute sulphuric or hydrochloric acid, the iron may be removed by filtration, and a colorless filtrate obtained, which at once gives the violet color on the addition of a ferrous salt. Ferric salts produce the same effect, being probably first reduced to the ferrous state, for the solution has powerful reducing properties. Salts of silver and mercury, potassium permanganate, bichromate, etc., are at once reduced by it in the cold. Cupric salts in presence of an alkali are reduced to cuprous oxide in the cold, and to metallic copper on heating.

The solution may be evaporated to dryness *in vacuo* without losing its properties, which are evidently due to some product of the decomposition, or perhaps direct oxidation of tartaric acid. The author hopes soon to succeed in isolating this substance, but at present is unable to obtain it free from admixed tartrates.

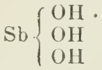
Instead of hydrogen peroxide in the above reaction, chlorine water, sodium hypochlorite, or acidulated potassium permanganate may be used, taking care to avoid excess; but the result is not so good as with the peroxide.—New Rem., May, 1881, p. 147; from Chem. News.

Argols from Greek Wines—Utilization.—The deposits of Greek wines, formed in casks, which are called *katapatia*, were in former times regularly thrown away and carried out in the sea as refuse. Professor Landerer, however, showed that these sediments—particularly those of the red wines from the islands Zea, Paros, and Santorin, contained sufficient tartar to make its extraction profitable. In consequence thereof, Italian merchants purchase all this refuse and export it to Milan or Naples, where it is utilized in the manufacture of cream of tartar.

Not only the red, but also white wines, and among the latter particularly the so-called "night-wines," yield cream of tartar. These "night-wines," or *κρασία τῆς νυκτὸς* (wine of the night), are so called from the fact that the grapes are cut and expressed at night-time. At the industrial expositions at Olympia these katapatia were found to contain 5 to 8 per cent. of tartrates. The other wines of Greece also contain cream of tartar, but, owing to the popular custom of treating the wines, for domestic consumption, with pitch, the residues become useless, so far as the extraction of cream of tartar is concerned. These resinous sediments, which have for centuries been thrown into the sea, have, in some places, produced regular *pitch-islands*, which have remained almost unaffected by the water. Professor Landerer first drew attention to the possibility of utilizing these deposits, and they are now regularly worked up in factories, yielding large quantities of oil of turpentine and pitch. Yet this industry is capable of large expansion, and needs only capital and energy to bring large returns.—New Rem., August, 1880, p. 231.

Bitartrate of Ammonium.—Mr. R. F. Fairthorne draws attention to this compound, which he thinks may find a useful place in medicine. It is readily prepared by adding a concentrated solution of tartaric acid to strong solution of ammonia, so that the acid shall be in excess. It has the appearance and taste of cream of tartar.—Am. Jour. Phar., May, 1881, p. 245.

Tartrates of Antimony—Constitution.—F. W. Clarke and Helena Stalls have made a study of the compounds, which, like tartar emetic, are assumed to contain the group antimony (SbO), and come to the conclusion that they are not tartrates proper, but salts of a complex acid called tartrantimonous acid. They analyzed the barium salts, and prepared also corresponding zinc and cobalt salts, the percentages of the metals found in these compounds corresponding fairly to that demanded by theory. Attempts to prepare the free acid failed on account of its instability. Their theory as to the constitution of tartar emetic, then, is that it is the potassium salt of an acid in which the dyad radical $C_4K_4O_6$ enters, replacing two groups, OH, of the antimonous hydrate, $Sb(OH)_3$, thus:



$$Sb\begin{cases}OH\\OH\\OH\end{cases}$$

Antimonous hydrate.

$$Sb\begin{cases}C_4H_4O_6\\OH\end{cases}$$

Tartrantimonous acid.

$$Sb\begin{cases}C_4H_4O_6\\OK\end{cases}$$

Tartrantimonite of potassium
(Tartar emetic).

—Am. Jour. Phar., January, 1881, p. 17; from Am. Chem., June 2d, p. 319.

Tartar Emetic—Method of Preparation in a Small Way.—Dr. Puerta gives the following process for making tartar emetic in a small way: Take 2 ounces of black sulphide of antimony, place it in an enamelled iron capsule, and pour on it by small portions commercial nitric acid, helping the reaction by means of a gentle heat. When fumes are no longer evolved the product is evaporated to dryness, washed with water to remove all nitric acid, and the residual antimonic oxide collected and dried; it weighs over 2 ounces. An equal weight of cream of tartar and 20 ounces of water are now added to the oxide contained in the same enamelled capsule, the whole is heated to boiling for three-quarters of an hour with constant stirring; next the liquid is filtered, concentrated to 25° B., and allowed to crystallize. The crystals are recrystallized once, and are then pure and colorless. The product should weigh $2\frac{1}{2}$ ounces.—From Restaurador Farmacéutico; in Drug. Circ., November, 1880, p. 196.

Argento-antimonious Tartrate (Silver Emetic)—Characters, etc.—Mr. J. P. Cooke has examined this compound, formed by the action of nitrate of silver on a solution of antimonous chloride in tartaric acid. It is soluble in 100 parts of boiling, and about 500 parts of cold water (15° C.), and its boiling saturated solution deposits the compound in colorless, brilliant, hemihedral crystals, belonging to the trimetric system. The crystals rapidly blacken in the light, and are easily decomposed by heat—at about 200° C. with a slight explosion. Analysis seems to indicate the formula $C_4H_4Ag(SbO)O_6H_2O$.—Jour. Chem. Soc., June, 1881, p. 419; from Sill. Jour. (3), 19, p. 393.

Citric Acid—Artificial Production.—During May of 1880, the announcement was made that two French chemists, Grimaux and Adam, had succeeded in producing citric acid artificially, by starting from glycerin, subsequently acting on one of the products with concentrated prussic acid, etc. This process, however, had only a scientific interest, and cannot be followed in practice for the purpose of manufacturing the acid.

On the 15th of August Professor Kekulé presented a paper to the Berlin Chemical Society in which he described a totally different synthesis of the same acid. He set out from *malic acid*, the acid of unripe apples, but one that has already been made artificially. In 1864, Wislicenus had converted it into acetyl-malic ether by treating diethylmalate with acetyl chloride.

The last-named ether was, by Kekulé, dissolved in ordinary ether, and treated with metallic sodium and monobromo-acetic acid. Of course the bromine in the latter combined with the sodium in the former, to form bromide of sodium, which separated because it was not soluble in ether. The other product was boiled with alcoholic potash, an operation known as saponification. This formed a potash salt insoluble in ether. From this he made the lead salt, and then set the acid free by passing sulphydric acid into its solution. At the time of his making this communication he had not purified the acid, but its reactions with lime salts were such as to satisfy him that it was in reality citric acid which he had obtained.—Ber. d. Deutsch. Chem. Ges.

Andreoni, an Italian chemist, has also given notice that he is trying to make citric acid from the triethylic ether of malic acid, by means of sodium and bromo-acetic ether, a method quite similar to that of Kekulé.—Ibid.; New Rem., January, 1881, p. 20.

The following is the method of Messrs. Grimaux and Adam: Starting from glycerin, they first produced, by treating it with chloride of sulphur and oxidation with potassium dichromate, *dichlorhydrin* ($CH_2Cl.CH.OH.CH_2Cl$). From the latter, by oxidation of the symmetrical dichloracetone, and by heating this with concentrated hydrocyanic acid, dichloracetone-cyanhydrin. This was converted, by treatment with hydrochloric acid, into dichloracetonic acid, the sodium salt of which, on being heated with potassium cyanide, yields a dicyanide, from which, after saturation with hydrochloric acid, warming for fifteen hours in a steam-bath, and careful treatment with lime, a crystalline acid was obtained, which was found identical with *citric acid*, both chemically and physically. The constitution of this body is therefore cleared up, and the only vegetable acid which has so far resisted synthetical production may now be produced artificially.—Pharm. Zeit.; New Rem., February, 1881, p. 50.

Citric Acid—Presence of Lead.—The presence of lead in citric acid has frequently been noted, but its quantity is usually very small. Mr. Otto Kasper has recently examined a specimen of citric acid which contained 0.675 gram of metallic lead per kilo (in saline combination?), a quantity which may prove dangerous when it is reflected that 40 grams are used for a "limonade purgative."—Schweiz. Wochenschr. f. Phar., October 15th, 1880, p. 382.

Borocitrates—Preparation.—In a former paper (see Proceedings, 1880, p. 317) Mr. Edmund Scheibe has drawn attention to borocitric acid and its salts. He has since extended his experiments, and gives formulas for an additional number, together with their analyses. By dissolving the components of the following formulas in hot water, the salts are readily obtained; most conveniently by evaporation to dryness, since, with the exception of the potassium compounds, the borocitrates crystallize with difficulty, or not at all.

Triborocitrate of Magnesium—$(C_6H_5O_7)_2Mg_3 + (B_3H_3O_6)_2$.—35 p. cryst. boric acid, 25 p. carbonate of magnesium, and 42 p. cryst. citric acid.

Diborocitrate of Magnesium—$(C_6H_6O_7)_2Mg_2 + (B_2H_2O_4)_2$.—42 p. cryst. citric acid, 16 p. carbonate of magnesium, and 24 p. cryst. boric acid.

Monoborocitrate of Magnesium — $(C_6H_7O_7)_2Mg + (BHO_2)_2$. — 80 p. cryst. citric acid, 16 p. carbonate of magnesium, and 24 p. cryst. boric acid.

Triborocitrate of Lithium—$C_6H_5Li_3O_7 + B_3H_3O_6$.—20 p. cryst. citric acid, 11 p. carbonate of lithium, and 18 p. cryst. boric acid.

Diborocitrate of Lithium — $C_6H_4Li_2(BO)_2O_7 + 2H_2O$. — 20 p. cryst. citric acid, 7 p. carbonate of lithium, and 12 p. cryst. boric acid.

Monoborocitrate of Lithium — $C_6H_6Li(BO)O_7 + H_2O$. — 20 p. cryst. citric acid, 4 p. carbonate of lithium, and 6 p. cryst. boric acid.

All of the lithium compounds are readily soluble in water.

Triborocitrate of Sodium—$C_9H_5Na_3O_7 + B_3H_3O_6$.—21 p. cryst. citric acid, 42 p. cryst. carbonate of sodium, and 18 p. cryst. boric acid.

Diborocitrate of Sodium.—20 p. citric acid, 28 p. carbonate of sodium, and 12 p. boric acid.

Monoborocitrate of Sodium.—20 p. citric acid, 14 p. carbonate of sodium, and 6 p. boric acid.

Triborocitrate of Ammonium—$C_6H_5(NH_4)_3O_7 + B_3H_3O_6$.—20 p. citric acid, 15 p. carbonate of ammonia, and 18 p. boric acid.

Diborocitrate of Ammonium.—20 p. citric acid, 10 p. carbonate of ammonium, and 12 p. boric acid.

Monoborocitrate of Ammonium.—20 p. citric acid, 5 p. carbonate of ammonium, and 6 p. boric acid.

These compounds must be dried with great care, otherwise a gradual decomposition, with escape of ammonia, takes place.

Triborocitrate of Potassium—$C_6H_5K_3O_7 + B_3H_3O_6$.—20 p. citric acid, 30 p. bicarbonate of potassium, and 18 p. boric acid.

Diborocitrate of Potassium.—20 p. citric acid, 20 p. bicarbonate of potassium, and 12 p. boric acid.

Monoborocitrate of Potassium.—20 p. citric acid, 10 p. bicarbonate of potassium, and 6 p. boric acid.

The potassium compounds are of higher theoretical value than the other borocitrates, though they have as yet not found therapeutic application.

Borocitrates of iron were prepared by the author by dissolving the freshly prepared hydrated ferric oxide in acid borocitrates of the alkalies.

Diborocitrate of sodium and iron, so prepared, contained nearly 8 per cent. of ferric oxide, while

Monoborocitrate of sodium and iron contained over 16 per cent.

Numerous experiments have shown that the citric acid salts of the heavy metals do not unite with boric acid to form definite compounds, and that permanent and definite compounds can only be produced in the borocitrates of the fixed alkalies.—Phar. Zeitschr. f. Russ., September 1st, 1880, pp. 513–520; Am. Jour. Phar., 1881, p. 64–68.

Atropic Acid—Synthesis.—The masterly researches of Professor Ladenburg, on the constitution of atropine and other solanaceous alkaloids, have repeatedly been mentioned in the journals. In our volume for 1880, p. 333, will be found a record of the successful synthesis of atropine from its products of decomposition, namely, tropic acid and tropine. It was only required now to find a method of producing both of these latter bodies artificially, and, at that time already, Professor Ladenburg announced that he expected to solve the question. On page 2041 of the "Berichte des Deutsch. Chem. Ges." (issued November 22d, 1880) the successful synthesis of tropic acid is now announced by Professor Ladenburg and L. Rügheimer.

Atropine has the composition $C_{17}H_{23}NO_3$. When this is heated with hydrochloric acid, or with baryta, it takes up one molecule of water, and is converted into a new alkaloid tropine $C_8H_{15}NO$, and tropic acid $C_9H_{10}O_3$ (both of which were successfully recombined, by Ladenburg, to atropine). It had previously been ascertained, however, that if the decomposition of atropine with baryta is conducted at a temperature of 130° C., or if hydrochloric acid is allowed to act upon it for several hours, at the same temperature, the tropic acid is itself deprived of one molecule of water, and is converted into $C_9H_8O_2$, which received the name of atropic acid, and into an isomer of the latter, of the same composition, and termed isatropic acid. In a previous communication, Professor Ladenburg has shown that hydratropic, atrolactic, atropic, and tropic acids may be successively converted one into the other, and, to accomplish the synthesis of tropic acid, it only remained now to produce one of the three first-mentioned acids artificially.

The particular acid which Ladenburg succeeded in producing is atrolactic acid. He started from dichlorethylbenzol $C_6H_5.CCl_2.CH_3$, which can, itself, be formed artificially. By treating with cyanide of potassium and alcohol, two carbon nuclei were introduced, producing $C_6H_5.C.CN.C_2H_5O.CH_3$, while chloride of potassium and hydrochloric acid were eliminated. The cyanogen nucleus was decomposed by treatment with barium hydrate, whereby ammonia was eliminated, and by treatment with hydrochloric acid, separating with ether, and final warming with carbonate of sodium, an ethylated atrolactic acid was obtained. This was easily converted into atropic acid by boiling with fifty parts of concentrated hydrochloric acid. It now only remains for Professor Ladenburg to succeed in accomplishing the synthesis of tropine.—New Rem., March, 1881, p. 81.

Apophyllenic Acid—A New Product from Narcotia.—In the decomposition of narcotine by oxidation with peroxide of manganese and sulphuric acid, Wöhler obtained, besides opianic acid and cotarnine, an oxidation product of the latter substance,—an acid containing nitrogen,—which, because of the resemblance of its crystals to the mineral "apophyllite," he named *apophyllenic acid.* The conditions of its formation were not determined, however. It is with difficulty soluble in cold, more readily in hot water, insoluble in alcohol and ether. It fuses, with partial decomposition, at 241° to 242° C. An analysis gave figures corresponding to $C_8H_7NO_4$.—Am. Jour. Phar., November, 1880, p. 548; from Ber. d. Deutsch. Chem. Ges., xiii, p. 1635.

Crystalloid Tannin—Preparation.—As is well known, tannin does not assume a crystalline form. Yet the chemical factory of E. Schering, at Berlin, has succeeded in producing a tannin which has a very deceptive crystalline appearance. This is prepared as follows: An aqueous, alcoholic, or ethereal solution of tannin is evaporated in a copper boiler or in vacuo, until the residue on cooling may be broken without being adhesive. This residue is then transferred to a double-walled boiler, made of copper, tin, or zinc, heated by steam, and the bottom of which is perforated by minute holes, through which the tannin, when melted, runs. Each drop as it issues has to fall for a distance of about 5 meters (=16.3 feet), and is spun out during its fall to a long fine thread, the surrounding atmosphere being kept warm. All these threads fall upon a rapidly revolving cylinder of wood or metal, from which the finished product is taken in more or less long threads.—From Neueste Erfind. und Erfahr.; in New Rem., August, 1880, p. 245.

Rhatania-Tannic Acid — Preparation, Characters, etc. — A. Raabe, after trying several methods for the preparation of the tannic acid of rhatany, finds that of Löwe for the preparation of gallo-tannic acid—which depends on the property of chloride of sodium to precipitate tannin from aqueous solution on the one hand, and the ready solubility of tannin in acetic ether on the other—to be the best for the purpose. The method, as applied to rhatany root, is as follows: A decoction, clarified by straining, is treated with a small quantity of chloride of sodium in pieces, triturating assiduously until the supernatant liquid becomes thinner and of a lighter color. The greater part of the coloring matter is thus precipitated, forming a dark doughy mass on the bottom of the vessel. The liquid is now filtered, mixed with an excess of chloride of sodium, and shaken with acetic ether. The ethereal solution is distilled, the residue redissolved in water, and shaken with ethylic ether until the aqueous layer has become perfectly clear; the latter is separated, heated to drive off the remains of ether, again treated with chloride of sodium in excess, then with acetic ether, and the solution in acetic ether distilled and evaporated to dryness. The tannic acid so obtained is a light yellow, light, amorphous powder, which readily dissolves in water, forming a clear solution. Alcohol and acetic ether also dissolve it easily; but absolute ether (*i. e.*, free from water or alcohol) dissolves only traces. Its aqueous solution forms precipitates with solutions of gelatin and albumen; ferric salts produce a green color, soon changing to a gray-brown precipitation; a mixture of ferric and ferrous salts produces a blue-green coloration. Rhatania-tannic acid is also precipitated from its aqueous solutions by acetate of lead (white flocculent), copper salts (brown from acetic solution), corrosive sublimate (white), nitrate of silver (nearly white, soon becoming dark); mercurous nitrate, chloride of gold, and alkaline copper solutions are reduced; bichromate of potassium produces a precipitate after a time. Baryta and lime-water produce precipitates, the supernatant liquids becoming darker, while the acetate of these bases do not produce precipitates. Unlike gallo-tannic acid, rhatania-tannic acid is not precipitated by tartar emetic. Its composition corresponds to the formula $C_{20}H_{20}O_9$. Contrary to the usual view, the author found that rhatania-tannic acid *is not a glucoside;* by the action of dilute acids it is simply split into water and rhatania-red, according to the following equation: $C_{20}H_{20}O_9 - H_2O = C_{20}H_{18}O_8$. Rhatany root, also, contains no gallic acid.—Phar. Zeitschr. f. Russ., October 1st, 1880, pp. 577–591.

Pyrogallic Acid—Simple Process of Preparation.—Mr. T. E. Thorpe draws attention to the following simple and expeditious method of converting gallic acid into pyrogallic acid, the product being particularly suited for developing photographic plates: 10 grams of dry gallic acid and 30 cc. of glycerin (preferably Price's) are placed in a 2-ounce flask or wide test-tube, and heated on a sand-tray to a temperature of 190° to 200° C., so long as bubbles of carbonic acid are seen to be formed in the liquid. The gallic acid is thus converted into pyrogallol in a very short time. The quantity of pyrogallol so produced—of course in glycerin solution—is about 6.5 grams, or, 65 per cent. of the gallic acid employed.—Phar. Jour. Trans., May 28th, 1881, p. 990; from Proc. Photograph. Soc. of Gr. Br.

ORGANIC BASES.

Alkaloids—Solubilities in Alcohol.—Mr. Albert Henry Lafean has determined the solubilities of certain alkaloids in alcohol at 60° F., as follows: Atropia in 2; cinchonia in 145; cinchonidia in 30; caffeia in 150; colchicia in 3; daturia in 2; morphia in 215; narcotia in 265; quinia in .8; quinidia in 115; strychnia in 175; and veratria in .8 parts. These results are given in the form of a table, showing the solubilities of these substances as given by various authorities, from some of which they differ very materially.—Am. Jour. Phar., April, 1881, pp. 149–151.

Alkaloids, etc.—Color Reactions.—Benjamin B. Hamlin, Jr., describes a series of experiments made with a number of proximate principles for the purpose of ascertaining their behavior to concentrated sulphuric acid, and the subsequent effect of oxidizing agents, of which at first a minute quantity of bichromate of potassium was added, and afterwards a solution of chlorinated lime. The proximate principles experimented with were of good commercial quality. The sulphuric acid probably contained traces of nitric acid, which appears to have modified the color in several instances. The following results of Mr. Hamlin may therefore require revision:

Principle.	Sulphuric Acid.	Bichromate of Potassium.	Chlorinate Lime.
Aconitia.	Yellowish-brown.	Green.	Greenish-yellow.
Atropia.	None.	Dark green.	Fading.
Brucia.	Pink.	Bright red.	Light green.
Caffeina.	Green.	Darker.	No change.
Cinchonia.	None.	Green.	Yellow.
Cinchonidia.	None.	Green.	Yellow.
Codeina.	None.	Black.	Fading.
Digitalin.	Black-brown.	Green.	No change.
Emetina.	Brown.	Green.	No change.
Gallic acid.	None.	Green.	Disappears.

Principle.	Sulphuric Acid.	Bichromate of Potassium.	Chlorinate Lime.
Mannit.	None.	Deep green.	Lighter.
Morphia.	Light pink.	Dirty brown.	Disappears.
Piperin.	Blood-red.	Very dark.	Disappears.
Quinia.	None.	Green.	Disappears.
Quinidia.	None.	Green.	Disappears.
Salicin.	Blood-red.	Darker.	Disappears.
Strychnia.	None.	Deep violet.	Disappears.
Tannin.	Golden-yellow.	Muddy.	Disappears.
Veratria.	Deep red.	Reddish-brown.	Light green.

Some observations on the effect of sulphuric acid in the presence of sugar are published by Maurice Robin in "Revue Scientifique." The compound is mixed with 2 parts of cane-sugar, a small quantity placed on a porcelain slab, one or two drops of pure sulphuric acid, and the mixture stirred with a glass rod. In this way the production of colors was observed to be as follows:

Atropia Sulphate.—Violet, deepening, finally brown.

Codeina.—Cherry-red, changing to violet.

Morphia Hydrochlorate.—Rose, rapidly changing to violet, persistent.

Narcotina.—Mahogany color, persistent; very characteristic.

Quinia Sulphate.—Greenish, bright yellow, finally blackish-coffee color, with yellow margin.

Salicin.—Bright red.

Strychnia.—Reddish, changing to blackish-coffee color.

Veratria.—Dark green.—Am. Jour. Phar., June, 1881, pp. 283–285.

Nitroprussides of the Alkaloids.—Dr. Edmund W. Davy has undertaken, and describes, a very extended series of investigations upon the character of the nitroprussides of the alkaloids. The author states that he has ascertained that nitroprussic acid is capable of forming compounds with the different alkaloids, which are, for the most part, very sparingly soluble in water; and when they are such, they may be readily obtained by treating any of their soluble salts with a solution of nitroprusside of sodium, when the alkaloidal nitroprusside will be precipitated—sometimes in a very characteristic condition. He has also ascertained that nitroprussic acid forms (as might have been expected from its being a bibasic acid) two classes of salts with the alkaloids, viz., neutral and acid salts. In the first there exist two molecules of base, and one of acid; and in the second, one molecule of each. And he has observed that some of the alkaloids, as for example, morphine, strychnine, and brucine, seem to be capable of forming only neutral salts, while others, as those of quinine, form both neutral and acid salts. He has also noticed that where the alkaloids form the two classes of salts, that in some cases the neutral salt is the most readily crystallizable (as in quinine), and the acid one much less so; or, the acid salt is most readily crystallizable (as in nicotine), and the neutral salt is much less so, or not at all. Dr. Davy describes in some detail the preparation and properties of the nitroprussides of the more important alkaloids, and he expresses the hope that his researches in this direction may prove of some practical value, as adding to the distinctive character of those bases, and thus affording additional means for their detection and separation under different circumstances.—Phar. Jour. Trans., March 12th, 1881, p. 756; from Proc. Royal Irish Academy, 2d series, vol. iii.

Cinchona Alkaloids—Constitution.—O. Hesse has communicated to "Liebig's Annalen" (205, pp. 314–357) a very comprehensive paper detailing his researches on the constitution of the cinchona alkaloids, which, in translation by Mr. F. B. Power, will be found in "Am. Jour. Phar." (March and April, 1881, pp. 105–112 and 160–169). The author's researches have indubitably shown that quinia, cinchonidia, and their isomers each contain one hydroxyl group, which they are capable of exchanging for acetoxyl. These hydroxyl groups could still be met with in the last derivative products in the hydrochlorapo-bases, proving the incorrectness of Zorn's views that one hydroxyl group is replaced by chlorine. It was further found that in the acetic ethers of cinchonidia and homocinchonidia the character of the respective base was retained, and from them, therefore,—in the one case cinchonidia, and in the other homocinchonidia,—could again be regenerated. This difference may possibly depend upon the condition that the respective hydroxyl groups in these two bases do not occupy the same position; on treating these bases with hydrochloric acid, however, a molecular change takes place by which this distinction disappears. Quinia, cinchonidia, and their isomers, by the treatment with hydrochloric acid, suffer a molecular change; at the same time, in the case of quinia and quinidia, methyl is eliminated. The new bases formed manifested themselves generally as unsaturated compounds, in that each took up one molecule of hydrochloric acid.

Although the facts presented by the author's admirable researches may permit a certain insight into the constitution of quinia, cinchonia, and their isomers, yet he considers that we are still far removed from the position of determining the perfect structures of the bodies in question. The researches of Butlerow and Wichnegradsky have shown with certainty that quinia, like cinchonia, contains, besides a chinolin nucleus, also a pyridin nucleus. While Mr. Hesse believes that the determination of the perfect structure of the cinchona alkaloids is only a question of time, he does not believe that the formation from their parts—*e. g.*, from chinolin and pyridin, as now maintained by many—will be successful.

Cinchona Alkaloids—Determination in Galenical Preparations by the Intervention of Picric Acid.—Mr. C. Schacht, after trying different methods for the determination of the alkaloids in wine of cinchona, has decided upon the following, which is dependent upon their precipitation by picric acid, and which experiments and experience have proven to be reliable:

100 grams of wine of cinchona are diluted with double the quantity of water, and the mixture is treated with 150 grams of cold saturated solution of picric acid. The voluminous precipitate is allowed to settle and collected on a filter, the filtrate being returned until it passes clear. The precipitate is then washed with some of the same solution of picric acid, and then, while on the filter, treated with ammonia, the portions adhering to the filter being loosened by means of a feather. The filter is then perforated, and the contents are collected in a glass-stoppered bottle of 100 cc. capacity (about 10 cm. long and 4 cm. diameter), the adhering precipitate being washed down with the spritz-bottle, and, finally, with a little absolute alcohol. To the contents of the bottle (which is now about one-half full) an equal volume of chloroform-alcohol mixture (chloroform, 4 parts; absolute alcohol, 1 part) is added, and the mixture is vigorously shaken; the two layers of liquid, which separate readily, are separated by inserting a 50 cc. pipette into the lower (greenish-yellow chloroformic) layer and withdrawing it; this operation is repeated twice, the final quantity of chloroform layer being separated from the dark red-brown layer by the aid of a separatory funnel. The united chloroformic solution is subjected to distillation, the residue is heated with a little water containing about 10 drops of diluted sulphuric acid until the last traces of chloroform are removed, and, after cooling, it is filtered. The greater part of the coloring-matter is removed from this solution by ammonia, after which the liquid is again filtered, and the alkaloids are precipitated with caustic soda. These are collected on a filter; they are dried at 120° C. and weighed. If considered necessary, the alkaloids in the filtrate and wash-water may be separated by evaporating them to one-fourth their volume, shaking out with ether, evaporating the ethereal solution, drying as above, and weighing.—Arch. d. Phar., August, 1880, pp. 81–96.

Cinchona Alkaloids—Identification.—Dr. Hager has communicated a lengthy paper on the identification of the individual cinchona alkaloids in their admixtures, both by the aid of the microscope and by their behavior to certain reagents. The paper is evidently an abstract from the author's "Supplement" of his "Pharm. Praxis," in which it may be conveniently studied.—Phar. Centralh., November 18th and 25th, 1880, pp. 411 and 426.

Cinchona Alkaloids—Comparative Value of Tests.—Mr. Charles W. Teeter communicates some experiments, made with a view to determining the value of the tests for the cinchona alkaloids as proposed in the American Pharmaceutical Association Report on the Revision of the Pharmacopœia. The author's object being to ascertain, by trial with mixtures of known composition, what approaches to accuracy can be attained in the use of the tests named, these were applied on mixtures of one with each of the other three alkaloidal sulphates, the chemical purity of which had previously been determined. The author's results are shown in five tables, for which see "New Rem.," September, 1880, pp. 258–260.

Quinia and Quinidia—Thalleioquin Test.—Mr. Charles Frederick Zeller has communicated the results of a series of experiments made with a view to determine the delicacy of the so-called thalleioquin test, and the influence of the presence of hydrochloric acid. Incidentally he determined that a solution of bromine (12 drops to f℥j water) is more delicate than chlorine-water, 100 grains of solution of sulphate of quinia requiring but 50 drops of the bromine solution and 1 drop of solution of ammonia to produce a clear emerald-green color. He sums up as follows: 1st. That the chlorine-water for performing this test should be freshly prepared is not absolutely necessary, provided it is preserved in amber-colored glass bottles, tightly corked, and kept in a dark place. 2d. That hydrochloric acid, when added to *fresh* chlorine-water, in quantities not exceeding 25 per cent., does not prevent its giving the test color, but will require a proportionately large amount of ammonia to neutralize the acid so added. 3d. That when hydrochloric acid is present in *old* chlorine-water it is due to the loss of chlorine, and it loses its value as a test liquid. 4th. It has been shown that bromine-water is about four times more delicate than chlorine-water; for this reason, and on account of the simplicity and ease with which bromine-water can be made, it is very much to be preferred as a means of performing the thalleioquin test.—Am. Jour. Pharm., August, 1880, pp. 385–389.

Quinia—Iodosulphate of Chinioidin a Reagent.—Dr. J. E. de Vrij communicates to "Am. Jour. Phar.," a paper in which he again draws attention to iodosulphate of chinoidin as a reagent for the qualitative and quantitative determination of quinia, and mentions some slight alterations made since the first publication of his process (see Proceedings, 1876, pp. 348, 349). These alterations are both in the preparation of the reagent and in its application to the determination, and may be briefly stated as follows: 1. Instead of employing Messrs. Howard & Sons so-called "sulphate of amorphous quinine" (sulphate of chinioidine), he directs the use of commercial chinioidine, which is dissolved in benzol, and the benzol solution then treated with dilute sulphuric acid so as to form a pure sulphate. 2. Instead of making the determination by adding the reagent to the alcoholic acidulated (sulphuric acid) solution of the *whole* of the mixed cinchona alkaloids, he now first extracts the latter by ether, and adds the reagent to the alcoholic acidulated solution of that portion of the mixed alkaloids (chiefly quinia) and amorphous alkaloid (chinioidin) that are taken up by the ether. For the details see the author's paper in "Am. Jour. Pharm.," August, 1881, pp. 394–398.

Sulphate of Quinia—Kerner's (Pharm. Germ.) *Test.*—Dr. G. Kerner has published an article in which he answers the objections raised by Dr. O. Hesse against his method of testing sulphate of quinia, which has been adopted by the Germ. Pharm. in 1872. The author has gone over the whole ground again, and gives tables of results obtained by his method upon known mixtures of cinchona alkaloids, which show the correctness of his results. He sums up his statements and results as follows:

1. In estimating the value of commercial sulphate of quinine, it should be required, as *first* condition, that it contains at least 74¼ per cent. of pure anhydrous alkaloid (dried at 115° C.). This quantity may be determined either directly or, better, by the loss of weight of the commercial salt at 115° C., which should not exceed 14.6 per cent.

2. The test for other cinchona alkaloids is to be carried out as follows: Introduce 2 gms. of sulphate of quinine, finely powdered, into a small flask; add 20 gms. of lukewarm distilled water, close the flask with a stopper, and shake it briskly at intervals. After half an hour set the flask in a basin containing cold water, and, when the contents are at a temperature of 15° C. (59° F.), as indicated by an introduced thermometer, shake again repeatedly and filter through a dry filter. Of the filtrate pour exactly 5 cubic centimeters into a 10 cubic centimeter cylinder, divided into tenths; add 3 cubic centimeters of strong solution of ammonia (specific gravity 0.920); close the cylinder with the finger, and invert it once. The mixture will in most cases be yet somewhat opaque. Then add, 1 drop at a time, strong solution of ammonia, each time mixing the contents by once inverting, until the liquid is perfectly clear (that is, until the last trace of color or opacity has disappeared, which may be accomplished to a drop). To bring about this result, should require altogether *at most* 5 cubic centimeters of the solution of ammonia (specific gravity 0.920).

Any sulphate of quinine which stands this test, in the proportions given above, cannot contain more than 1 per cent. of sulphate of cinchonidine or other cinchona alkaloids.

To answer these two requirements is all that need practically be demanded from the officinal sulphate of quinine. Of course it is to be understood that the salt has previously been shown to be free from foreign substances and adulterations.—New Rem., May, 1881, p. 137; and Arch. Phar., 1880, No. 6.

Bromide of Quinia—Preparation.—Mr. E. Ledger, having had frequent occasion to prepare the basic hydrobromate of quinia, recommends the following process as preferable to others, and particularly to that adopted by the Societé de Pharmacie of Paris, in which an equivalent quantity of bromide of barium is decomposed with a boiling aqueous solution of sulphate of quinia:

Sulphate of quinine, commercial, crystallized, . . .	40 parts.
Bromide of potassium, dried and powdered, ...	11 "
Alcohol, 80 per cent., ...	400 "
Distilled water, ...	400 "

Dissolve the sulphate in two hundred parts of alcohol by the aid of heat, add the bromide of potassium, dissolved in 30 parts of distilled water, continue the heat five or six minutes in order to allow the sulphate of potassium, which is formed, to acquire greater compactness, so that it will more readily settle. Filter off from the precipitate, and wash four times with 50 parts of boiling alcohol. Let the alcoholic solution cool, when a further small quantity of sulphate of potassium will be deposited. The solution is then again filtered through white filtering-paper, and evaporated on a water-bath to 100 parts. Next, 400 parts of distilled water are poured on, and heat is applied until the bromhydrate is completely dissolved. After allowing the solution to stand in the cold for about twenty-four hours the capsule will be found filled with a compact crystalline mass. The crystals are transferred to a filter, allowed to drain, and dried by exposure to air. Heating would cause them to fuse. The product thus obtained amounts to about 30 parts of perfectly white hydrobromate of quinine. By evaporating the mother-water to one-third of its volume, about 6 parts more may be obtained.

It is absolutely necessary, as has been already pointed out by Boille, to redissolve the hydrobromate in water as above stated, if the salt is to be obtained in white and bulky crystals.—New Rem., January, 1881, p. 14; from Répert. de Pharm., September, 1880.

Bromide of Quinia—Hypodermic Use.—Professor J. T. Whittaker recommends bromide of quinia for hypodermic purposes in preference to all other quinia salts. Though less soluble in water than the bisulphate it is richer in alkaloid, and dissolves in 15 parts of water or in 4 parts of glycerin by the aid of heat.

Professor Whittaker recommends the following method: Into a test-tube put 20 grains of bromide of quinine and 2 drachms of water and cork the tube. In order to use it, heat the tube (without smoking it) over a flame, and in two or three minutes solution of the crystals will have taken place. Pour a quantity into a teaspoon, that has previously been warmed, and from thence it may be drawn into the syringe (also warmed) and immediately injected *under* the skin. The usual ½-drachm syringe will contain the equivalent of 5 grains of the salt.—From Cin. Lancet and Clinic; in New Rem., January, 1881, p. 14.

Iron and Quinia Citrate—Improved Process of Preparation.—Mr. J. U. Lloyd proposes the following process, which yields a uniform salt, corresponding in its alkaloidal strength to that of the U. S. Ph. (about 13 per cent. quinia): Dissolve 22 parts of sulphate of quinia in 2800 parts of distilled water, with the aid of sufficient sulphuric acid, and cool the solution with a lump of ice. Add to this gradually, with constant stirring, a sufficient amount of water of ammonia to completely precipitate the quinia, avoiding any considerable excess. Transfer the precipitate immediately to a filter, place a lump of ice in it, and drain the precipitate until a spongy magma remains and the filtrate passes in drops only. Dissolve 100 parts of citrate of iron and ammonium, and 10 parts of citric acid, in 300 parts of distilled water, cool the solution, add to this the precipitated quinia, and stir until it is dissolved. Then filter the solution, evaporate it to the consistence of thin syrup, spread it upon glass, in thin layers by means of a brush, and dry in a current of warm air, etc.—New Rem., September, 1880, p. 263.

Citrate of Iron and Quinia—Detection of Amorphous Quinia.—Amorphous quinia, when substituted in the above for crystalline, is not easily detected by the test of the Br. Phar. Dr. de Vrij, however, finds that it may easily be detected by transforming the separated quinia into the neutral oxalate. This oxalate, after being thoroughly dried on a water-bath, is dissolved in chloroform, and the solution, if necessary, filtered. If a few drops of water are put on the top of this solution in a test-tube, the oxalate of quinia will take a part of the water and crystals of oxalate of quinia will appear in the chloroform, whilst the water remains clear and uncolored if the medicine is not sophisticated. If it contains, however, amorphous quinia, the oxalate of this base will be taken up from the solution in chloroform, and the water on the top of this solution will be more or less yellow colored by the oxalate of amorphous quinia which has been dissolved by it.—Chem. and Drug., September, 1880, p. 382; from Proc. Brit. Phar. Conf., 1880.

Propionylquinia ($C_{20}H_2(C_3H_5O)N_2O_2$)—*A New Base.*—O. Hesse has obtained this by treating the hydrochlorate of quinia for several hours with propionic anhydride at a temperature of 60° to 80° C., adding a little water, evaporating, dissolving the residue in water, adding ammonia in excess, and agitating with ether. On evaporating the ethereal solution prisms are obtained, imbedded in a tough mass, from which they are removed by suitable manipulation. The new base forms colorless hexagonal prisms of the rhombic system, melts at 129° C. (uncorr.), and is rather freely soluble in ether, alcohol, and chloroform, but with difficulty in water. The alcoholic solution is bitter, strongly alkaline, yields quinia and propionic acid on being boiled with potassa, and becomes intensely green on the addition of chlorine and ammonia. The alkaloid is lævogyre; its solution in dilute sulphuric acid shows blue fluorescence. The tough amorphous compound in which the crystals are imbedded is also propionylquinia. Not a trace of a quinicia derivative is obtained.—Am. Jour. Phar., April, 1881, p. 156; from Liebig's Annalen, 205, p. 358.

Hydroiodide of Quinidia—Preparation.—Mr. A. F. W. Nietsch recommends the following process for preparing this compound, which, by reason of its insolubility, has found some application in the treatment of children: 10.00 grams of sulphate of quinidia are dissolved in hot water, and a hot solution of 4.60 grams of iodide of potassium in twice its weight of water is added. After cooling, the precipitate is washed and dried.—D. A. Apothek. Ztg., August 15th, 1880, p. 5.

Sulphate of Quinidia and Sulphate of Cinchonidia—Comparative Value.—Dr. Bourru has made careful clinical researches with reference to the extent to which the sulphate of cinchonidine may be substituted for the much more expensive sulphate of quinine in the treatment of malarial affections. He calls attention to the fact that, to act effectively, it should be given from five to seven hours before the time for the occurrence of the paroxysm; departure from this rule seems to interfere with the action of cinchonidine more than with that of quinine, perhaps because the action of the former is less intense or less durable. The administration of cinchonidine is not followed by vertigo, tinnitus aurium, disturbances of vision, or any other inconvenient symptoms induced by quinine. A study of twenty-nine cases of malarial intermittent fever treated by the author with sulphate of cinchonidine, the dose varying from eight decigrams (gr. xij) to one gram (gr. xv), gives the following results: In sixteen cases the sulphate of cinchonidine was given alone, and cut short the fever. In ten of these cases no paroxysm occurred after the first dose. These comprised five cases of quotidian type, four of tertian, and one of quartan. In four cases two doses were necessary before the paroxysms ceased to occur; one of these was of quotidian type, and the remaining three were of tertian. In two cases three doses were required to accomplish a cure; one of these was of quotidian type, and the other of quartan. In all these cases it was observed that the medicine failed to prevent the occurrence of the paroxysm when it was given too long, or not long enough, before it. In eight cases in which quinine had previously failed cinchonidine was successful. Three of these were of quotidian type, three were of tertian, and two were of quartan. In three other cases quinine and cinchonidine both alike failed to effect a cure. In two cases, in which the fever was associated with inflammation of the liver and biliary passages, perhaps of malarial origin, the sulphate of cinchonidine acted very satisfactorily, seeming to affect favorably the progress of the hepatic trouble. To sum up, of twenty-seven cases of malarial intermittent fever treated with sulphate of cinchonidine, twenty-four were cured, three were not cured, resisting quinine also. Two cases of malarial intermittent fever, complicated with hepatic disturbances, were cured by the remedy.—N. Y. Med. J.; from Bull. Gén. de Thér.; New Rem., February, 1881, p. 54.

Borate of Chinoidine.—Dr. de Vrij has modified the method previously given by him for the preparation of borate of quinoidine (chinoidine), because it was frequently found to contain free boric acid. The best quinoidine is that which, when warmed with 2 parts of boric acid and 10 parts of water, is completely dissolved. Such are the quinoidine of C. Zimmer in Frankfort and Ph. Whiffen in London, the former yielding 50 per cent. and over of borate.

Two parts of quinoidine and 1 part of boric acid are heated with 20 parts of distilled water in a covered vessel to incipient boiling, whereby a portion of the quinoidine, namely, the so-called amorphous alkaloid (Sertürner's *chinoidine*, or Hesse's *diconchinine*), is dissolved in combination with boric acid. The vessel is then removed from the fire and, after a momentary rest, the hot, clear, dark-brown and alkaline liquid poured through a funnel containing some moistened picked cotton, in order to remove some resinous matters floating in the liquid. The insoluble residue, dried on the water-bath and finely powdered, yields a brown powder, which no longer melts on the water-bath, and which represents a mixture of various unknown bodies, which are indeed almost entirely soluble in mineral acids, but do not contain any more of the amorphous alkaloid. After removal of the insoluble matter, the clear liquid is replaced in the cleansed vessel and heated to boiling, when a fresh quantity of dark-brown resinous body separates. By allowing the liquid to stand at rest for a few minutes, it may be poured off clear, when it is again raised to boiling, and these manipulations must be repeated until no more matter separates on boiling, and the liquid, after cooling, is perfectly transparent. The liquid is now evaporated until it is equal in weight to the quinoidine used, and then set aside for at least one night at a temperature of not exceeding 15° C. (59° F.). In proportion to the quality of the original quinoidine, there will be found more or less boric acid crystallized out, which is collected, gently expressed, then dried, and reserved for the next operation. The clear dark reddish-yellow liquid, which is distinctly alkaline to litmus-paper, is now evaporated on the water-bath until it forms a dry yellowish powder, or else it is converted into scales.

Well-prepared borate of quinoidine yields, with 3 parts of cold water, a perfectly clear, dark-yellow, strongly alkaline solution. A 10 per cent. aqueous solution, on the addition of hyposulphite of sodium, must remain perfectly clear. One gram of the borate in aqueous solution, mixed with soda and shaken with chloroform, should yield to the latter solvent at least 0.54 gram of amorphous alkaloid. It is not very hygroscopic, but, since it is apt to attract moisture gradually, it must be preserved in well-closed bottles.

In view of the complex composition of the commercial quinoidine, Dr. de Vrij considers the borate to be the most uniform preparation, and the most suitable form of employing it therapeutically. It has been used with excellent results in intermittent fevers by Dr. Hermanides, of Geldermalsem, and by Dr. P. Simpson, of Bankipore (Bengal).—From Haaxman's Nieuw Tijdsch. and Pharm. Zeit., No. 22; in New Rem., June, 1881, p. 170.

Quinoline—Synthesis.—According to W. Koenigs quinoline is formed by the dry distillation of acroleinaniline, and may be purified by Baeyer's method ("Ber. d. D. Chem. Ges.," 12. p. 460), viz., by treatment with potassium chromate and sulphuric acid. The best method for preparing quinoline is by acting on a mixture of nitrobenzene, aniline, and glycerol with sulphuric acid. In this process it is probable that acroleinaniline is formed as an intermediate product.—Jour. Chem. Soc., September, 1880, p. 672; from Ber. d. D. Chem. Ges., 13, pp. 911–913.

Quinoline—Physiological Effects, etc.—The intimate relationship of this base with the cinchona alkaloids, and the fact that it may, since the discovery of Mr. Zd. Skraup, be obtained in any quantity from aniline, has induced Mr. Julius Donath to make experiments with a view to determining its antipyretic and antiseptic value. The experiments, having been made upon healthy animals, do not fully establish its antipyretic value; but the results point very conclusively to action that is very closely allied to that of quinia. The experiments relative to its antiseptic value are of a more positive character, and prove it to retard the fermentation and putrefaction of various substances, such as urine, blood, gelatin, milk, etc., in a marked degree.—New Rem., April, 1881, p. 103; from Ber. d. Deutsch. Chem. Ges., 1881, p. 178.

Strychnia—Occurrence of a Hydrate.—Mr. E. Jahn has observed that when a solution of a strychnia salt (1 : 200) is treated with ammonia, long, delicate, four-sided truncated prisms make their appearance in the course of a few seconds. The ends of these crystals appear to be cut off at right angles with their length. If these are collected and pressed to free them from the greater part of adhering liquid, a change takes place, which is readily visible under the microscope. They assume the shape of columnar rhombic octahedra, and, here and there, of short rhombic prisms, and after a short time no trace of the original structure remains. The new form of crystals differs from the four-sided prisms of strychnia, obtained when the same solution is precipitated at a boiling temperature, in that the ends of the latter are oblique, and in that they are not subject to change. He believes the former therefore to be crystals of a hydrate of strychnia, the exact composition of which, however, he has been unable to determine, since they are changed so rapidly into the octahedral form above mentioned. The author believes, furthermore, that this peculiarity may explain how Schüzenberger (1858) could have been led to believe that strychnia is really a mixture of several alkaloids, differing in their crystalline structure as well as in the quantity of carbon contained. Analyses of their gold and platinum chlorides proved the identity of the anhydrous square prismatic and octahedral forms.—Arch. d. Phar., March, 1881, p. 185.

Strychnia and Brucia—Antiseptic Property.—Professor Carlo Pavesi has observed that the salts of strychnia and brucia possess, in an eminent degree, antiseptic and antifermentative property. Meat immersed in a solution of sulphate of strychnia (strength not given, Rep.) and kept for months at a temperature of 16° to 18° C. remained sweet and inodorous. Milk, urine, blood, albumen, gelatin, honey, and sugar, were perfectly preserved in this way; leguminous seeds were prevented from germinating; bitter almonds and mustard, if first deprived of fixed oil, are deprived of the power of developing essential oil. All seeds of the strychnos family, particularly the St. Ignatius bean and nux vomica, are used in tropical countries as remedies, but, singularly enough, only against fevers and poisonous bites. The author considers that the effectiveness of the remedy in these diseases may possibly be owing to the antiseptic and antifermentative power of the alkaloids.—New Rem., October, 1880, p. 302; from Boll. Farm. (Milano), 1880, p. 234.

Alkaloids from Belladonna and Datura Stramonium.—According to E. Schmidt the crude alkaloid from the roots of belladonna contains hyoscyamia and atropia; the crude alkaloid from the seed of *Datura stramonium* contains atropia, daturia, and hyoscyamia. After recrystallizing the impure alkaloids from dilute alcohol, tropia is found in the mother-liquor. Atropia and daturia-platinochlorides crystallize in the monoclinic system and are isomorphous. Tropia platinochloride also crystallizes in this system. Hyoscyamia platinochloride crystallizes in the triclinic system.—Jour. Chem. Soc., May, 1881, p. 293; from Ber. d. D. Chem. Ges., 14, pp. 154–157.

Atropia and Daturia—New and Characteristic Reaction.—Dr. Dioscoride Vitali finds that the color reaction produced by nitric acid and caustic potassa upon atropia (either pure or as separated in the usual manner from organic mixtures) is extremely delicate, and presents all the conditions necessary for justifying its adoption in toxicological examinations. During this reaction an alkaloidal base (*Nitro atropine*), entirely different from the original atropia, is produced, which remains unaltered in the organism, and may be easily discovered in the urine. This, as well as other color reactions, is shared by *daturia*, and the author believes this to be evidence of their identity.

The conditions under which the reaction may be obtained most favorably are the following: Either a solid alkaloid, suspected of being atropine, is to be examined, or a solution containing it. In the first case it is only necessary to add to it directly, in a porcelain capsule, about ten times its volume of concentrated nitric acid, to heat the liquid for a few minutes to boiling, then to continue the heat at a low temperature until all free nitric acid has evaporated. When the capsule has become cold, a few drops of a recently prepared alcoholic solution of potassa are dropped into it, allowing them to run down the inner side of the capsule. As soon as the alkaline solution touches the residue, the violet color makes its appearance, passing in a very short time to wine-red and muddy red.

In the second case, when a solution is to be tested, the liquid is to be evaporated to dryness at a gentle heat, and the residue is treated with nitric acid, and so on, as in the previous case. If the nitric acid contains nitrous products, this circumstance, instead of hindering the appearance of the reaction, rather increases its brilliancy.

This reaction is extremely sensitive, and is characteristic exclusively of *atropine* (and daturine). It may be obtained with certainty and ease, even from the alkaloid extracted in the usual manner, from organic mixtures.

Though the reaction is not very fugitive, still it does not last long. Nevertheless it presents the great advantage of being reproduced many times from the same quantity of material, no matter how small this may be. Besides, it is produced not only from the free alkaloid, but also from its salts. The sensitiveness of the reaction is such that it may be observed with a few drops of a solution of sulphate of atropine, containing as little as 0.000001 gm. ($\frac{1}{64000}$ grain) of the salt.

Tropic acid likewise shows a handsome reaction, by means of which its presence may be discovered, and which may be used when testing for atropia in those cases in which the latter has undergone decomposition.—New Rem., November, 1880, p. 330; from Boll. Farm., 1880.

Atropia—Characters, etc.—To obtain pure atropia, L. Pesci exhausted dry belladonna leaves with water, evaporated the infusion at a gentle heat, and, after mixing the syrupy mass with soda solution, extracted the alkaloid by agitation with benzene. The benzene solution was then agitated with dilute sulphuric acid, and the acid solution after addition of an alkali was in like manner agitated with chloroform. On mixing the chloroform solution with an equal volume of light petroleum (benzolene), and allowing it to evaporate spontaneously, the liquid soon became filled with long colorless needles of pure atropia. The mother-liquors contain a small quantity of another alkaloid. Pure atropia ($C_{17}H_{23}NO_3$) melts at 106°–108° C. With picric acid it produces a yellow precipitate, even in presence of sulphuric acid; with concentrated sulphuric acid no coloration in the cold, but a yellow tinge appears on heating, and on adding water a pleasant odor of roses is evolved. When strongly heated with nitric acid it yields picric acid, but if it is gradually added to fuming nitric acid, maintained at about 50° C., it dissolves with a slight yellow coloration, which subsequently disappears. On neutralizing the product and extracting with ether an oily base is obtained, which differs from atropia in its reactions as well as in its physiological effects, since it does not appear to be poisonous, and does not cause dilatation of the pupil.—Jour. Chem. Soc., May, 1881, p. 293; from Gaz. Chim. Ital., 10, pp. 425–430.

Homatropia—Advantages, etc., over Atropia.—Professor A. Ladenburg describes a further number of "tropeïnes," lately obtained by him, in conjunction with G. Meyer. These embrace: 1. *Oxybenzoyl-tropeïne* ($C_{15}H_{19}NO_3$); 2. *Paraoxybenzol-tropeïne* ($C_{15}H_{19}NO_3$); 3. *Ortho-oxybenzoyl-tropeïne* or *Salicyl-tropeïne* ($C_{15}H_{19}NO_3$): 4. *Benzoyl-tropeïne* ($C_{15}H_{29}NO_2$); 5. *Phthalyl-tropeïne* ($C_{24}H_{32}N_2O_4$); 6. *Atroxyl tropeïne* or *Anhydro-atropine* ($C_{17}H_{21}NO_2$); 7. *Cinnamyl-tropeïne* ($C_{17}H_{21}NO_2$); and *Oxytoluyl-tropeïne*, or

Homatropine ($C_{16}H_{21}NO_3$), which is by far the most interesting, and bids fair to rival, if not supplant, atropia. It is prepared from tropine, amygdalic (phenyl-glycolic or benzo-glycolic), and dilute hydrochloric acids, and readily forms crystallizable salts, among which the bromhydrate is easily obtained in moderately large crystals. The alkaloid itself, which Professor Ladenburg had not succeeded to obtain in crystals, has now also been obtained in crystals by Mr. Merck. These are transparent, colorless, and regular, and were obtained on a large scale by recrystallization from absolute ether. While not very soluble in water, these crystals are nevertheless hygroscopic and very deliquescent. The bromhydrate is soluble in 10 parts of water, forming a stable solution. The crystals are not hygroscopic.

The mydriatic effects of homatropine have been carefully tested in the clinic of Professor Völkers, of Kiel. The base is distinguished by the peculiarity, that its effects—which are about of the same energy as those of atropia—disappear in a much shorter period, in about twelve to twenty-four hours. Professor Quincke has found that it is much less poisonous than atropia, which is another advantage.—New Rem., October, 1880, p. 297; from Ber. d. Deutsch. Chem. Ges., 1880, p. 1340.

Homatropia—Therapeutic Value.—Dr. Henry S. Schell observes—in the "Specialist and Intelligencer"—that the hydrobromate of homatropia is not as desirable as a mydriatic as is atropia, owing to its tendency to cause irritation of the conjunctiva and the impermanence of its effect. As a suppressor of accommodation, however, homatropine is valuable in a solution of 2 grains to a fluid drachm of distilled water. The accommodation begins to be affected in about ten minutes, full suppression is reached in an hour or less, recession begins in about three hours, and is complete in ten hours from the time the application is made. No constitutional effects are noticed. Compared with it, the paralysis from atropia is much longer, being in the neighborhood of ten days duration.—New Rem., February, 1881, p. 53.

Homatropine—Action.—The hydrobromate is the subject of a paper in the "Medical Times" of November 6th, by Dr. P. D. Keyser, in which the writer confirms the observations of Völkers and Fuchs, that complete paralysis of accommodation does not take place in the majority of cases from its use, and that the pupil is not always dilated to its full limit. The weaker solutions are not potent enough to accomplish full paralysis, and stronger solutions cause so much irritation as to lead to antagonistic action of the circular fibres of the iris.

Duboisine is more powerful, its effects more persistent, it does not cause conjunctival irritation, it completely dilates the pupil, and paralyzes accommodation. He notes that in its use it should not be allowed to flow into the tear duct, owing to the risk of toxicological effects. The chief value of hydrobromate of homatropine lies in the rapidity with which its effects pass away, thus enabling the accommodation to be temporarily paralyzed for purposes of diagnosis.—New Rem., March, 1881, p. 85.

Duboisine—Substitution for Atropine.—Duboisine has been substituted by Dr. Dujardin-Beaumetz for atropine as a hypodermic injection for exophthalmic goitre, and in the two cases in which he has tried it, great diminution of the palpitations and vascular throbbings resulted. He has also noticed a readily cumulative effect from repeated doses, although he used only very small quantities—a quarter to a half milligram; the symptoms resembling the poisonous effects of belladonna.—New Rem., March, 1881, p. 85.

Duboisina—Crystallization.—Mr. Duquesnel has presented to the French Academy crystallized specimens of the pure alkaloid of *Duboisia myoropoides*, which had previously been obtained only as a syrupy amorphous product of a yellow color (see Proceedings, 1879, p. 519). Duboisina crystallizes in fine colorless needles, grouped around a central point; it is much less soluble in water than the amorphous product, and forms with sulphuric acid a neutral salt, easily crystallizable, deliquescent, and possessing very energetic mydriatic properties. The chemical study will determine in what respect it resembles or differs from atropia (see Proceedings, 1880, p. 335), and its physiological study has been undertaken under the direction of Dr. Laborde, who will make known the results.—Am. Jour. Phar., March, 1881, p. 128; from Jour. de Pharm. et de Chim., January, 1881, p. 39.

Alkaloid from Piturie—Characters and Composition.—After reviewing the literature upon "piturie" (much of which has been abstracted for previous reports), Professor Liversidge communicates the results of his experiments and studies of the characters and composition of the alkaloid. The piturie was extracted with boiling water slightly acidified with sulphuric acid, the liquid concentrated by evaporation and distilled with an excess of caustic soda, the alkaline distillate neutralized by hydrochloric acid, and evaporated over a water-bath until reduced to a small bulk; the yellowish residue was once more distilled with caustic soda, the distillate neutralized with hydrochloric acid and again concentrated. It was now nearly colorless, caustic soda was again added, and the liquid shaken up with ether. The ether was next removed by distillation at as low a temperature as possible in a current of hydrogen, the heat meanwhile being raised gradually until it reached 140° C., a bath of sulphuric acid being used for this purpose. It was allowed to remain at this temperature for about six hours; the bath was then removed, and the distillation continued at a still higher temperature over a naked flame, the current of hydrogen being still maintained, until all the alkaloid, with the exception of a very small quantity which had become charred, had passed over in a clear and colorless condition. During the distillation the thermometer indicated a temperature between 243° and 244° C. Sixty grams of piturie yielded 0.622 gram = 1.037. per cent. of alkaloid. In this case the alkaloid was not allowed to boil, but was maintained at a temperature of 140° C. in a current of hydrogen for several hours to remove water and traces of ammonia. In a second experiment 500 grams of the piturie gave 12.34 grams of alkaloid, or 2.47 per cent., when distilled in a current of hydrogen. The piturie did not contain any non-volatile alkaloid.

The alkaloid when freshly prepared is clear and colorless, but with access of air rapidly becomes yellow, and finally brown, especially when exposed to the sunlight. It is soluble in all proportions in water, alcohol, and ether. It is just a little heavier than water. When freshly prepared it has a smell like that of nicotina; afterwards, when darkened in color and thickened in consistency, the odor is more like pyridina. Its taste is acrid, pungent, and very persistent. It is volatile at ordinary temperatures, neutralizes acids completely, but the neutral solution of the acetate, sulphate, and hydrochloride all become acid on evaporation from the loss of alkaloid, and these salts can only be obtained in a dry condition (bitter, dry, and varnish-like masses) when kept over strong sulphuric acid. The oxalate is the only salt obtainable in crystals, but is acid owing to the loss of alkaloid during concentration. The composition of the alkaloid was found to be C_6H_8N, or, perhaps, this may have to be doubled, viz., $C_{12}H_{16}N_2$. The author gives a large number of reactions with the usual reagents for alkaloids.

Piturina differs from *conia* by its aqueous solution not becoming turbid on heating nor by addition of chlorine-water; from *anilina* by not being colored by chloride of lime; from *picolina* in specific gravity; from *pyridina* by its reaction with sulphate of copper; from *nicotina* by its reaction with platinic chloride, gold chloride, iodine, and mercuric chloride, and by Palm's test.—Pharm. Jour. Trans., April 2d, 1881, pp. 815–818; from Proc. Royal Society of New South Wales, November, 3d, 1880.

Hyoscine—A Second Alkaloid Occurring Naturally in Hyoscyamus.—Professor Ladenburg has noticed some time ago that hyoscyamus contained, beside hyoscyamine, a second alkaloid which remained in the mother-liquor after the crystallization of the hyoscyamine. It is separated by conversion into the gold salt, which is less soluble, has a duller lustre, forms better crystals, and has a higher melting-point than the hyoscyamine-gold chloride. The products of the decomposition of the pure alkaloid, which the author found to have the composition $C_{17}H_{23}NO_3$ (isomeric with atropine and hyoscyamine) were ascertained to be tropic acid and a basic substance, which differed in a characteristic manner from tropine, and which the author calls *pseudotropine.* Professor Ladenburg having previously shown that the decomposition product of hyoscyamine, hitherto called hyoscine, is identical with tropine, he now proposes the name hyoscine for the second alkaloid naturally occurring in hyoscyamus. According to experiments of Professor Völkers, hyoscine has equally great mydriatic power as atropine.—New Rem., December, 1880, p. 364; from Ber. d. Deutsch. Chem. Ges., 1880, p. 1549.

Aconitia and Allied Alkaloids—Characteristics.—Mr. C. R. Alder-Wright communicates the following characteristics of aconitia and allied alkaloids:

Aconitia ($C_{33}H_{43}NO_{12}$ or $C_{26}H_{35}NO_7\left\{\begin{matrix}(OH)_3\\ O.CO.C_6H_5\end{matrix}\right)$.—This alkaloid appears to be the chief, if not the only, active alkaloidal ingredient in the roots of *A. napellus*, occurring therein together with amorphous alkaloids of lower molecular weight, and containing a higher percentage of carbon. From these alkaloids the free base partially separates by solution in ether and spontaneous evaporation, the ether being preferably previously mixed with very light petroleum spirit, as recommended by Duquesnel. If the amount of aconitia present, relatively to the amorphous bases, is not considerable, it is often impossible to get the former to crystallize at all (at any rate on the small scale); in any case a considerable amount of aconitia is retained in solution permanently by the agency of the amorphous alkaloids, which thus cause considerable loss, much as alkaline salts do in the case of sugar crystallization. Even after repeated crystallization from ether or ether-petroleum spirit, aconitia retains mechanically minute quantities of the amorphous bases, which, however, can be wholly eliminated by conversion into a salt, crystallization thereof, and regeneration of the alkaloid (by treatmeat with an alkali and crystallization from ether) from the salt thoroughly freed from the mother-liquor, which contains the amorphous base as salt; the hydrochloride, hydrobromide, and nitrate are salts answering well for this purpose, especially the two last. When perfectly pure, aconitia melts in a capillary tube at 183° to 184° C. (corrected), the melting-point being lowered by the presence of amorphous bases; the final complete melting is preceded by a slight fritting, beginning a few degrees below the melting-point, and is accompanied by only very slight darkening with the pure base, by more if impure. This test, together with the following, constitutes the two simplest criteria of purity: The alkaloid to be examined is dissolved in a few drops of some dilute acid, some pure ether added, and then some sodium carbonate solution in excess, and the whole well agitated in a stoppered bottle; the ethereal solution is decanted and allowed to evaporate spontaneously; when only a small quantity is left, this is decanted from the crystals that have formed, into another vessel and allowed to evaporate to dryness. If the aconitia was tolerably pure, the last drops of ethereal mother-liquor will dry up to crystals, but if more than minute quantities of amorphous bases were present, these will accumulate in the mother-liquor, the last portions of which will dry up, not to crystals but to a varnish or gumlike mass. The gold salt of aconitia should not darken on drying over sulphuric acid in the dark (presence of amorphous alkaloid often causes decomposition to a small extent on drying); after desiccation, first over sulphuric acid till visibly dry, and finally in the water-bath, it should contain a trifle under 20.00 per cent. of gold (theoretically 19.92). If the base contains amorphous alkaloids, the gold percentage is a little higher, specimens purified only by crystallization from ether generally containing 20.2 to 20.3 per cent. of gold. On heating for some hours to 100° C. in a closed vessel with alcohol and a little caustic potash, aconitia should yield close to 19 per cent. of benzoic acid (theoretically 18.92), which can be extracted and estimated by evaporation of the alkaline fluid to dryness, solution in water, treatment with hydrochloric acid and ether, and spontaneous evaporation of the ethereal solution, with purification of the residue from resinous by-products if necessary. The acid thus formed should not produce any substance capable of giving a green color to ferric chloride on fusion at 250° C. with caustic potash, and treatment of the "melt" with hydrochloric acid and ether, and evaporation to dryness of the ethereal solution (indicates freedom from pseudaconitia). Pure aconitia should contain close to the theoretical amount of carbon and hydrogen, viz., 61.39 and 6.67 per cent. respectively. These analytical figures are the only reliable means of distinguishing aconitia from the closely allied alkaloid recently described under the provisional name "japaconitia" (see "Proceedings," 1880, p. 337, and below), which agrees very closely with aconitia in all the other above-named points.

Pseudaconitia ($C_{36}H_{49}NO_{12}$ or $C_{27}H_{37}NO_5\left\{\begin{matrix}(OH)_3\\ O.C_9H_9O_3\end{matrix}\right.$).—The chief, if not the only, active ingredient of *A. ferox* roots; considerably less easily crystallizable than aconitia; melting-point, when pure, near to 104° to 105° C. (not very distinctly marked, fritting commencing a few degrees lower), no darkening in color accompanying the final fusion. No conclusions as to purity can be drawn from the incomplete crystallizability of the base (or its nitrate), as infinitesimal amounts of impurity, too small for analytical determination, and other circumstances, greatly affect the crystallizing power. Should yield, on "saponification" with alcoholic potash, near to the theoretical amount of veratric (dimethyl-proto-catechuic) acid (viz., 26.49 per cent.), especially after purification of the acid formed from resinous by-products, and should give analytical numbers near to the following theoretical values:

Carbon in base (anhydrous), ...	62 88
Hydrogen in base "	7 13
Gold in gold salt, ...	19.10

Slightly higher percentages of gold being found (as with aconitia) when the base is only purified by crystallization from ether, and hence retains minute quantities of the amorphous bases occurring together with it in the roots.

Japaconitia ($C_{66}H_{88}N_2O_{12}$).—Provisional name applied to a base occurring in aconite roots (query as to species), recently imported into

England from Japan. First examined by Paul and Kingzett, who attributed to it the formula $C_{29}H_{43}NO_9$. Exhibits very close similarity to aconitia, furnishing almost exactly the same amount of benzoic acid on saponification (theoretical percentage 19.6), and melting at almost the same temperature (184° to 186° C. instead of 183° to 184° C., corrected). Crystallizes from ether just about as readily as aconitia, furnishes very similar salts, and can only be distinguished conveniently by analytical numbers, the theoretical values being uniformly higher than with aconitia, viz.:

Carbon in free base,	63.67
Hydrogen "	7.07
Gold in gold salt,	20.39

—Pharm. Jour. and Trans., July 3d. 1880, pp. 2, 3.

Aconite Alkaloids.—C. R. A. Wright and E. H. Rennie have reported on the alkaloids contained in the fresh aconite herb (*Aconitum napellus*), grown at Foxton, in Cambridgeshire. They were isolated by the methods previously described (see "Proceedings," 1875–1880), but crystals could not be obtained, though the mixture appears to contain notable quantities of aconitia. The quantity of active alkaloid contained in the herb is probably somewhat less than that contained in the roots, reckoned on the dry substance. It can, however, hardly be concluded from these experiments that it is a general rule that aconite roots are richer in crystallizable aconitia than the dry herb; for, according to Mr. John Williams, it has happened in his factory that no crystallizable aconitia, but only non-crystallizable bases, could be isolated from batches of roots worked up on the manufacturer's scale in precisely the same way as other batches which readily yielded crystals.—Chem. and Drug., September, 1880, p. 381; from Proc. Br. Phar. Conf., 1880.

Caffeine—Decomposition Products, etc.—Professor E. Schmidt is engaged in researches on caffeine to ascertain the true rational formula of this valuable drug, as well as to settle the question as to the existence of certain salts of this alkaloid. He has now communicated a preliminary description of some of the results of his researches, from which the following may find place here: The most important experiment for getting an insight into the true composition of caffeine was the preparation and examination of its decomposition product.

Caffeidine.—The best way of preparing this was as follows: One part of caffeine is boiled with 10 parts of crystallized barium hydrate until a strong solution of ammonia and methylamine occurs, these being the only gases formed. The superfluous barium hydrate is removed by dilute sulphuric acid, and the resulting slightly acid liquid evaporated to a thin syrup, whereupon caffeidine sulphate precipitates in the form of thick needles, which are easily purified by recrystallization from alcohol. The oily mother-liquor from the crude caffeidine sulphate contains the sulphates and formiates of methylamine, ammonia, and sarkosine. The free caffeidine is an oily, very alkaline liquid, easily soluble in water, alcohol, and chloroform, but difficultly soluble in ether. Beside the sulphate—$C_7H_{12}N_4OH_2SO_4$—the author has also formed and ascertained the formula of several other salts of caffeidine. As regards certain

Caffeine salts, such as the citrate, etc., the author has found that neither a *citrate* nor a *formiate* of the base can be formed. *Caffeine acetate* forms colorless needle-like crystals, which give up their acetic acid to the air very quickly even at the ordinary temperature. Normal *butyrate of caffeine* forms white short needles which often congregate in clusters; the *isovalerianate* forms colorless shining needles. From the results obtained, Professor Schmidt has already drawn certain conclusions as to the constitution of caffeine, but he is still occupied with the subject, and reserves a definite opinion for another paper. —Chem. and Drug., May, 1881, p. 213; from Ber. d. Deutsch. Chem. Ges., April 11th, 1881.

Citrate of Caffeine—Question of Existence.—Professor J. U. Lloyd has experimented with a view to determining whether a definite compound of citric acid and caffeine exists or not. His results lead him to conclude that *citrate of caffeine is a definite compound*, but that it is decomposed by solvents which dissolve citric acid readily and caffeine sparingly. It may be easily made by the following process, which yields, however, a product contaminated to some extent with both free citric acid and caffeine:

Dissolve 30 grains of caffeine in 1 fluid ounce of chloroform and mix this with a solution of 30 grains of crystallized citric acid in ½ an ounce of alcohol. Filter if necessary, and evaporate the filtrate in an evaporating basin over a water-bath until the residue is of a syrupy consistence. Remove the dish, then cool to 50° F., rubbing the contents of the dish with a spatula, and continue until a dry powder results. A semi-crystalline powder results, which is permanent in air, soluble in a mixture of 1 part of alcohol and 2 parts of chloroform; soluble also in cold water, but decomposing, and if the proportion of caffeine is greater than its solubility in water, this is deposited in feathery crystals. Its relation to alcohol, specific gravity 0.835 and 0.805, is the same as to water; the salt is decomposed, and caffeine is precipitated if in excess of the quantity soluble in the alcohol.—New Rem., February, 1881, p. 38.

Caffeine and Theobromine—Oxidation Products.—Maly and Bücheregger have studied the oxidation products of caffeine and theobromine with a view to gaining some further light on the relationship of these two substances. They have found that although they are very weak bases, strangely enough, heating them to a temperature of 200° C. in sealed tubes respectively, with such powerful agents as hydrochloric and sulphuric acid, both dilute and concentrated, has no effect on them. The authors, however, succeeded in effecting the oxidation of these bases by boiling them for some hours with a mixture of bichromate of potassium, sulphuric acid, and water, in certain proportions. Under these circumstances, *caffeine* yields colestrophane (dimethylparabanic acid), ammonia, methylamine, and carbonic acid; while theobromine yields monomethylparabanic acid, ammonia, methylamine, and carbonic acid.—Chem. and Drug, May, 1881, p. 215; from Ber. d. Deutsch. Chem. Ges., April 11th and 25th, 1881.

Sulphate of Berberia—Cause of Precipitation in Dilute Solutions.—When this salt, officinal in the Phar. Br., is dissolved in 6 to 8 parts of water, it forms, as is required by that standard, a clear solution; but on further dilution a muddy-looking mixture is formed, which, on standing, deposits a bulky precipitate. Dr. Maglan had thought this to be due to a second alkaloid (sipirina), and, subsequently, to an oxidation product of berberia. Mr. J. Nesbit has now made experiments which lead him to the conclusion that the commercial salt is deficient in sulphuric anhydride to the extent of 4 per cent. If this deficiency is made good, the salt will be soluble in all proportions of water, with the exception of a very small percentage of oxidation product, which is removable by filtration. In the concentrated solution of the commercial salt, the sulphate of berberia holds the uncombined alkaloid in solution.—Drug. Circ., April, 1881, p. 51; from Phar. Jour. Trans.

Hydrastria—Preparation.—Dr. L. Wolff draws attention to an improved method of obtaining the alkaloids of *Hydrastis canadensis.* It consists in exhausting the root of the fatty oils by percolating with gasoline before proceeding to prepare the alkaloids; the advantage derived by this procedure is quite considerable; the purification of the hydrastia is then effected with greatly less trouble.—Am. Jour. Phar., March, 1881, p. 138.

Aspidospermine and Paytine—Identity.—Dr. N. Wulfsberg, assistant at the Pharmacological Institute at Göttingen, identifies quebracho bark from *Aspidosperma Quebracho* with a bark which had been analyzed in 1870 by Hesse, and which was at that time only known as "Cortex Chinæ albæ de Paytan." Hesse already showed that this bark could not be a cinchona; he discovered in it an alkaloid which he named paytine. Flückiger, likewise, found that this bark could not be derived from a rubiaceous tree. Dr. Wulfsberg now finds that it exactly corresponds, in every respect, to quebracho bark, and that the two alkaloids, aspidospermine and paytine, yield, on analysis, figures which make it highly probable that the two substances are identical, considering also the similarity of reaction.—From Pharm. Zeit., 1880, No. 72; in New Rem., February, 1881, p. 54.

Alkaloids of Quebracho Bark.—The above statement and observations of Dr. Wulfsberg have induced Dr. Hesse to make a comparison of the two alkaloids, in the course of which he discovered that the bark of *Aspidosperma Quebracho* contains no paytine whatever, and that aspidospermine is totally different from this alkaloid. .

But this examination led to another unexpected and interesting result. It is well known that the true quebracho bark has been found an efficient remedy in many cases of asthma; but Dr. Penzoldt, who could not find a proper therapeutical agreement between the properties of the bark and those of the alkaloid aspidospermine, surmised that the bark contained, besides the latter, some other body of therapeutic activity.

Hesse has now ascertained that quebracho bark indeed contains a second alkaloid *of therapeutical value*, and in larger proportion (0.28 per cent.) even than aspidospermine (0.17 per cent.). Hesse calls this new alkaloid *quebrachine*. It crystallizes from alcohol in small, white, anhydrous prisms, dissolves easily in hot, sparingly in cold alcohol, and is difficultly soluble in ether. It melts at 214° to 216° C. (uncorr.) under partial decomposition. Its constitution corresponds to the formula $C_{21}H_{26}N_2O_3$. In pure concentrated sulphuric acid it dissolves with a bluish color, and this tint becomes darker in the course of a few hours. If peroxide of lead is mixed with the acid, the solution rapidly acquires a magnificent blue color. Especially handsome is this reaction if sulphuric acid containing molybdic acid be used, or if a small crystal of potassium dichromate is added to the solution of the alkaloid in concentrated sulphuric acid. Since quebrachin, when boiled with solution of perchloric acid, yields a yellow solution, the preceding reactions resemble somewhat those of curarine and strychnine. On the other hand, Dr. Penzoldt found that the physiological effect of quebrachine (in the frog) did not agree with that of strychnine, although it had a considerably poisonous effect. According to Penzoldt, 0.04 gram of the alkaloid speedily produced death in a small rabbit.

Quebrachine is a strong alkaloid, turning red litmus-paper blue in alcoholic solution, and neutralizing strong acids completely. Its neutral sulphate crystallizes in colorless, short, square prisms, which are very easily soluble in alcohol and hot water, and also quite soluble in cold water. If the crystallization is disturbed, it is obtained only as a crystalline powder. In either case its composition is $(C_{21}H_{26}N_2O_3)_2$-

$H_2SO_4.8H_2O$. The neutral hydrochlorate also crystallizes in short white prisms, which are but very little soluble in cold, but easily in hot water. Its aqueous solution yields a dark-yellow flocculent precipitate with platinic chloride.

Dr. Hesse states that quebracho bark contains, besides aspidospermine and quebrachine, three other alkaloids, and he promises further details in a subsequent paper.—From Ber. d. Deutsch. Chem. Ges., 1880, p. 2308; in New Rem., April, 1881, p. 180.

Alkaloids of Jaborandi Leaves—Preparation and Characters.—After briefly reviewing the results of previous experimenters, Drs. Erich Harnack and Hans Meyer announce the discovery of a second alkaloid in jaborandi, which is easily produced from *pilocarpine*, and is present in many commercial samples of the same. They, furthermore, find that the physiological effects of *pilocarpine* are entirely analogous to those of *nicotine*, while the action of the new alkaloid, for which they propose the name "*jaborine*," corresponds entirely with that of *atropine*. The complete separation of jaborine from commercial pilocarpine, or the crude alkaloid obtained by precipitation with phosphotungstic acid, is by no means easy; but the following method, though wasteful, will accomplish their separation: The alcoholic solution of the impure salt of pilocarpine is precipitated with platinic chloride, the precipitate washed thoroughly with alcohol, and dissolved in boiling water. That portion of the platinum salt which first separated out in the cold, in the form of thin crystalline laminæ, is dissolved in water and decomposed by hydrosulphuric acid. The filtrate is concentrated, supersaturated with water, and shaken energetically with repeated portions of ether. Pilocarpine, being with difficulty soluble in ether, mostly remains in the aqueous solution, which contains then no more jaborine. On now precipitating the acidulated solution with phosphotungstic acid, and decomposing the precipitate with barium hydrate, absolutely pure pilocarpine is obtained. Upon the basis of several analytical data, the authors arrive at the formula $C_{11}H_{16}N_2O_5$ for pure pilocarpine.

The existence of a second alkaloid in the commercial pilocarpine having been ascertained, the authors attempted its separation from the crude material placed at their disposal by Mr. Merck (of Darmstadt). This material consisted of concentrated mother-liquors,—derived partly from jaborandi leaves and partly from the so-called false jaborandi (*Piper reticulatum* and other species),—all of which were left behind after the crystallization of pilocarpine, and which appeared in form of a thick red-brown syrup, having the odor of oil of tobacco, and a strongly alkaline reaction. The two best methods so far discovered by the authors for obtaining the new base are the following:

1. The alcoholic solution of the crude mother-liquor, acidulated with

hydrochloric acid, was precipitated in fractions with platinic chloride. (The chloroplatinate of jaborine is more soluble than that of pilocarpine.) The first portion of the precipitate, which soon coalesces to smeary, rapidly hardening, and (in water) insoluble masses, is rejected, the decanted liquid further precipitated, filtered, and the filtrate now completely precipitated. After again filtering, the alcoholic filtrate generally deposits. on standing, another small quantity of the jaborine salt. The latter and the last precipitation are then extracted with boiling water, and the filtrate concentrated *in vacuo* over sulphuric acid. Chloroplatinate of jaborine then separates either as a fine bright-yellow powder or as a dark-red amorphous lumpy mass. Protracted washing with alcohol abstracts from this deposit a little coloring-matter, but the whole of it cannot be so removed. By decomposing the platinum salt, both the free base as well as ordinary salts were obtained, but always in yellowish amorphous masses.

2. The crude substance was dissolved in water with the aid of hydrochloric acid, filtered, and the filtrate treated with solution of mercuric chloride until the first milky cloudiness began to increase to a precipitate. By protracted agitation and subsequent filtration a bright-yellow liquid was obtained, which, after removal of the mercury by sulphydric acid, was concentrated, mixed with caustic soda, and then shaken out with ether. The ethereal solution, on evaporation, leaves behind the jaborine as a colorless amorphous mass.

The composition of jaborine, so far as the authors are jastified to conclude, must be closely approaching that of pilocarpine. But the most interesting fact is this, that *jaborine is easily formed from pilocarpine.* Even the mere concentration of acid solutions of pilocarpine is sufficient to cause the formation of small quantities of jaborine, which may be recognized by its physiological effects. The same happens when pilocarpine is heated with hydrochloric acid in sealed tubes. Still larger quantities are obtained by simply heating pilocarpine itself.

The authors have found that the commercial fluid extract of jaborandi is free from jaborine, but on evaporating the alcoholic and acidulated solution of an extract a notable quantity of jaborine will be formed. The presence of the latter cannot be certainly detected by physiological experiments in the fluid extract, etc.. and the possibility is therefore not excluded that small quantities of jaborine are contained, ready formed. in the leaves of jaborandi itself.—New Rem., November, 1880, pp. 327–329; from Liebig's Annal., 204, p. 67.

Pilocarpine Salts—Solubility.—Dr. Theodor Schuchardt communicates the following in reference to the solubility of salts of pilocarpine:

Hydrochlorate of pilocarpine exhibits a remarkable congruence of solubility in hot and in cold water. 100 parts of boiling water dissolve 66 parts of the salt, and water at 15° C. (59° F.) dissolves nearly the same amount. Of alcohol of specific gravity 0.820 it requires 7 parts for solution at 15° C.; the same alcohol, boiling, easily dissolves 2½ parts of the salt.

Nitrate of pilocarpine is soluble at 15° C. in 8 parts of water; at 100° C. it has the same solubility as the preceding salt. It requires 130 parts of alcohol, specific gravity 0.820, at 15° C., and 40 parts of the same alcohol, boiling.—New Rem., May, 1881, p. 141.

Cocaina—Preparation.—V. Truphème exhausts coca leaves by ether in Payen's percolator, arranged for continuous distillation, when a blackish-green liquid is obtained, which is evaporated to dryness. The residue is agitated with boiling water, which dissolves the alkaloid, leaving the impure wax behind. The solution is mixed with magnesia, evaporated to dryness, and the residue treated with amylic alcohol, from which slightly yellowish crystals are deposited, and these are obtained colorless by one crystallization.—Am. Jour. Phar., June, 1881, p. 305; from Jour. de Phar. et de Chim., April. 1881, p. 329.

Coniine and Salts—Composition, etc.—Professor A. W. Hofmann, of Berlin, has found that the hitherto accepted formula for coniine, namely, $C_8H_{15}N$, is defective by two hydrogen atoms, and should be $C_8H_{17}N$. Hence all previous conclusions regarding the supposed identity of artificial products of the formula $C_8H_{15}N$ with natural coniine are based on error. The new formula has been derived partly from careful analyses of the hydrochlorate and hydrobromate, the preparation of which will interest pharmacists.

Hydrochlorate of coniine, $C_8H_{17}N.HCl$, is easily obtained by dissolving coniine in anhydrous ether, and treating the solution with *dry* hydrochloric acid gas. The salt is instantly separated as a brilliant white crystalline mass, which only needs to be strained off. This salt is extremely soluble in alcohol and water, but it is not in the least hygroscopic. It may be dried, without decomposition, at 100° C. (212° F.).

Hydrobromate of coniine, $C_8H_{17}N.HBr$, may either be made like the preceding, only substituting hydrobromic acid gas for hydrochloric, or it may be prepared—and in a very pure condition, but with a slight loss of product—by adding bromine in drops to a solution of coniine in anhydrous ether as long as the color of bromine disappears. There is produced a substitution-product of coniine, which remains dissolved in the ether and causes a trifling loss, while at the same time the bromhydrate separates. This salt can likewise be dried at 100° C. without decomposition.—From Ber. d. Deutsch. Chem. Ges., 1881, p. 705; in New Rem., June, 1881, p. 157.

Ptomaïnes—Importance of the Cadaver-bases in Forensic Analyses.—Professor Theod. Husemann reviews the recent investigations that have been made in Italy in reference to the character of the basic substances that form in human cadavers, and draws attention to their importance in connection with forensic analyses. These investigations had been made by Professor Selmi (in one case assisted by Professors Casali and Vella) with the purpose of clearing up two supposed cases of poisoning, the one that of General Gibbone, who was supposed to have died from the effects of *delphinin*, the other that of a lady named Sonzogno, who was supposed to have died from the effects of opium (or morphia). In both cases it was satisfactorily proven that the alkaloids found previously by experts were neither delphinin in the one nor morphia in the other case, but that they were cadaver-bases, which in their reactions bore some resemblance to these bases. These cases have attracted so much attention that the Italian minister of justice has appointed a commission of renowned chemists and pharmacologists, who, under the presidency of Professor Selmi, are charged with the duty of determining the true characters and reactions of the ptomaïnes formed by putrefactive change in cadavers. Upon the basis of the investigation made by Professor Selmi in the two cases above referred to, Professor Husemann draws the following conclusions:

1. That several fixed cadaver-bases exist, which differ in their behavior to solvents and reagents in their physiological action (partly poisonous and partly non-poisonous), and which resemble in their general alkaloidal reactions those of the vegetable bases.

2. That some of these ptomaïnes are soluble in ethers, while others are not, but dissolve in amyl-alcohol, and that other fixed cadaver-bases exist which are insoluble in both solvents.

3. That the behavior of the ptomaïnes to the so-called general alkaloidal reagents is not always the same, so that, for instance, some will afford precipitates with chloride of platinum, argento-potassic cyanide, and bichromate of potassium, while others will not.

4. That the ptomaïnes are capable of forming crystallizable compounds, particularly with hydriodic acid containing free iodine.

5. That they give color-reactions with various reagents, which resemble those produced with some of the vegetable bases.

Finally, the ptomaïnes generally are acrid, and produce a benumbing sensation upon the tongue without bitterness.—Arch. d. Phar., November, 1880, pp. 327–346.

GLUCOSIDES, ETC.

Glucosides—Decomposition by Heat.—H. Schiff finds that on heating several of the glucosides to temperatures slightly above their fusing-points they are decomposed, and in several cases in a very simple and exact manner. *Æsculin*, *phlorizin*, *arbutin*, *salicin*, and *helicin* are thus decomposed, glucosan being in each case separated from the changed substance by simple solution in water and evaporation.—Am. Jour. Phar., April, 1881, p. 171; from Ber. der Chem. Ges., xiv, p. 303.

Glucoside from Ivy Leaves.—L. Vernet has isolated the glucoside from ivy leaves, the presence of which had been indicated in 1875 by F. A. Harsten (see Proceedings, 1875, p. 448). The bruised leaves (collected in December) are exhausted with hot water; an alcoholic extract is then prepared, which is powdered, washed with cold benzol, and afterwards treated with boiling acetone, from which the glucoside crystallized on cooling, requiring washing with cold acetone and crystallization from alcohol to obtain it pure. It crystallizes in nodules of colorless, silky needles, is neutral to test paper, melts at 233° C., and burns without leaving any residue. It is insoluble in water, chloroform, and petroleum; dissolves very slightly in cold, but readily by the aid of heat, in acetone, benzol, and ether; its best solvent is hot (90 per cent.) alcohol; hot alkalies readily dissolve it. Its composition is $C_{32}H_{54}O_{11}$. When heated with dilute sulphuric acid it yields a very sweet right-rotating sugar (which reduces Fehling's solution, but does not ferment with yeast) and fine, inodorous, and tasteless needles, $C_{26}H_{44}O_{6}$, which melt near 280° C., are less soluble in alcohol than the original compound, and are insoluble in alkalies.—Am. Jour. Phar., June, 1881, p. 306; from Rép. de Phar., March, 1881, pp. 106, 107.

Helicin—New Modification.—H. Schiff finds that pure crystallized helicin, moistened with 1 per cent. nitric acid, and then dried for some days in the air, and finally in an air-bath to 110° to 115° C., is changed, without other loss of weight than that caused by the difference of water of crystallization, into an amorphous modification. If by washing with warm water and then with alcohol the unchanged helicin is removed, a gelatinous or pulverulent white mass is left, which shows no crystalline structure whatever, and after drying at 110° *in vacuo*, yields no water. When analyzed it gave the exact figures of pure helicin. Its behavior is, however, quite distinct from that of ordinary helicin. It is almost insoluble in water, alcohol, cold potassium hydrate, and glacial acetic acid, in which normal helicin is tolerably soluble. It is not colored yellow by potassium hydrate, etc. It can be changed back into normal crystallized helicin easily when dissolved in warm, very dilute hydrochloric acid, from which the greater part will crystallize as normal helicin on cooling.—Am. Jour. Phar., April, 1881, p. 172; from Ber. d. Chem. Ges., xiv, p. 317.

Glycyrrhizin—Characters.—J. Habermann has continued his researches on glycyrrhizin (see Proceedings, 1878, p. 612, and 1879, p. 52ə) and gives a detailed account of these, and of its decomposition products. He shows: (1.) That *glycyrrhizic acid*, on boiling with dilute sulphuric acid, decomposes into parasaccharic acid and glycyrrhetin. Sugar was not found among the decomposition products. (2.) That *parasaccharic acid* is distinguished from ordinary saccharic acid by affording no crystallizable salts. (3.) That pure *glycyrrhetin* is a crystalline, almost indifferent nitrogenous body, which gives very characteristic products with bromine, nitric acid, and acetic chloride, but does not yield paraoxybenzoic acid on being fused with potash. (4.) That commercial *ammoniacal* glycyrrhizin, besides containing glycyrrhic acid, also contains (*a*) *amorphous glycyrrhizin bitter*, a nitrogenous compound of an intensely bitter taste, and occurring in subordinate quantities only; and (*b*) dark-brown *glycyrrhizin resin*, soluble in alcohol and in alkaline aqueous solution to yellow-colored liquids, also fusible with caustic potash, and yielding with a resinous compound various volatile fatty acids and paraoxybenzoic acid.—Jour. Chem. Soc., September, 1880, p. 671; from Chem. Centralbl., 1880, pp. 253–256, 267–271, 282–287.

Ammoniacal Glycyrrhizin—Preparation.—Connerade directs this to be prepared in the following manner: Macerate ground licorice root with one and a half parts by weight of water, strain, wash the residue with a very small quantity of water, heat the mixed liquids to boiling to coagulate albumen, strain again, and then add diluted sulphuric acid (1 in 10) as long as a precipitate is produced. Let this settle, decant the liquid, and dissolve the precipitate in solution of ammonia diluted with 9 parts of water. Filter the latter and evaporate it to dryness. The compound then remains as a brown, friable varnish, unaltered by air, of a pure, sweet taste, easily soluble in cold water, and imparting to the latter, even when diluted to 1 in 1000 parts, an amber color. The yield is about 10 per cent. of the weight of the root.—New Rem., March, 1881, p. 81.

Picrotoxin—Characters, etc.—Barth and Kretschy have separated from picrotoxin (obtained from *Menispermum Cocculus*) by fractional crystallization from benzol, and afterwards from water, three constituents, viz.: Picrotoxin, picrotin, and anamirtin, and in the relative proportions of 32 : 66 : 2. Picrotoxin has a fusing-point 201° C., reduces silver nitrate, especially on addition of ammonia, and Fehling's solution when heated, and is exceptionally bitter and poisonous. Its composition corresponds to the formula $C_{15}H_{16}O + H_2O$.

Picrotin is more difficultly soluble in benzol, fuses at 250° to 251° C., shows nearly the same properties as picrotoxin, but is not poisonous. Its composition is $C_{25}H_{30}O_{12}$.

Anamirtin is found in the mother-liquors of the pure picrotoxin when crystallized out of water. It has a neutral reaction, does not reduce ammoniacal silver solution, nor Fehling's copper solution, has almost no bitter taste, and is not poisonous. Its composition corresponds to the formula $C_{19}H_{24}O_{10}$.—Am. Jour. Phar., October, 1880, p. 495; from Ber. d. Deutsch. Chem. Ges., xiii, p. 1243.

Calycin—A New Principle.—O. Hesse obtained from *Calycium chrysocephalum*,—a yellow lichen growing upon oaks, birches, firs, etc.,—by treating with boiling ligroïn, a golden-yellow, crystalline, tasteless substance, which he has named *calycin.* It is sparingly soluble in cold ligroïn, benzin, ether, alcohol, and glacial acetic acid, somewhat more soluble in chloroform, has a neutral reaction, melts at 240° C., and sublimes in red prisms. Its composition is $C_{18}H_{12}O_5$, and it is the anhydride of *calycic acid*, which is formed by treating calycin with hot alkaline or earthy carbonates in the presence of water, and on being liberated by hydrochloric acid, again yields calycin. On heating with concentrated potassa solution a trace of oil, probably toluol, distils over, and the calycin with assimilation of water is split into oxalic acid and alphatoluylic acid, $C_8H_8O_2$.—Am. Jour. Phar., May, 1881, p. 256; from Ber. d. Chem. Ges., xiii, p. 1816.

COLORING MATTERS.

Coloring Matter of Flowers—Chlorophyll the Source.—Hitherto it has generally been supposed that the various colors observed in plants were due to so many different matters,—each color being a different chemical combination without relation to the others. Now, however, Professor Schnetzler shows by experiment that when the color of a flower has been isolated by putting it in alcohol, one may, by adding an acid or an alkali, obtain all the colors which plants exhibit. The pæony, for example, yields, when macerated in alcohol, a violet-red liquid. If some acid oxalate of potassium be added the liquid becomes pure red, while soda changes it, according to the proportion, into violet, blue, or green. In the latter case the green liquid appears red by transmitted light, just as a solution of chlorophyll does. The sepals of the pæony—which are green, bordered with red—become wholly red when placed in a solution of acid oxalate of potassium. These changes of color, which may be obtained at will, may quite well be produced in the plant by the same causes, since in all plants there always exist acid or alkaline matters. Without desiring to affirm it absolutely, Professor Schnetzler supposes, *a priori*, that there is in plants only one coloring-matter,—*chlorophyll*,—which, being modified by certain agents, furnishes all the tints that flowers and leaves exhibit. As for white flowers, it is well known that their cells are filled with a colorless fluid, opacity being due to air contained in the numerous lacunæ of the petals. On placing the latter under the receiver of an air-pump they are seen to lose their opacity and to become transparent as the air escapes from them.—Am. Jour. Phar., May, 1881, p. 255; from Jour. of Appl. Science, February 1st, 1881.

Chlorophyll—Components.—Mr. F. Hoppe-Seyler has obtained from chlorophyll, by means of alcohol, two coloring-matters: a greenish-white coloring-matter, which is red in transmitted light, probably identical with the erythrophyll of Bougarel, and a crystalline coloring-matter which crystallizes in needles, and appears in reflected light, dark green; in transmitted light, brown. The latter appears to be closely related to the chlorophyll of the living plant; its alcoholic and ethereal solutions show the red fluorescence and a strong absorption between *B* and *C*, as also bands in yellow and green, which are relatively more prominent than a freshly prepared chlorophyll solution. The new substance, which the author has named

Chlorophyllon, is permanent, and gave on analysis C73.4H9.7N5.62 O9.57 and P1.37. On melting it with potassa a liquid ammonium base with low atomic weight, a substance not yet closely examined, and an acid of a purplish-red color are formed. The barium salt of this acid, which the author has named *dichromatic* acid on account of its double fluorescence, has a composition corresponding to $(C_{21}H_{33}O_3)_2Ba$. The author regards the "*crystallized chlorophyll*" of Gautier (see Proceedings 1880, p. 352) to be a mixture of *erythrophyll* and *chlorophyllon* with some wax.—Am. Jour. Phar., December, 1880, p. 605, and Schweiz. Wochenschr. f. Phar., p. No. 30, 1880; from Zeitschr. f. Physiol. Chem.

Alkannin—Preparation.—Carnelleti and Nosini have obtained this body from the commercial color (from *Anchusa tinctoria*) by extracting it with dilute potash solution. This extract was shaken with ether to remove a reddish-brown acid, an impurity present in the alkannin obtained by Pelletier, Bolley, and Weydler. The solution in potash, when saturated with carbonic acid, gives a precipitate of alkannin which was further purified by solution in ether. It is obtained as a dark reddish-brown mass, with metallic lustre, and is sparingly soluble in the ordinary solvents; it is most easily soluble in chloroform and glacial acetic acid. Its alcoholic solution is not changed by exposure to light or by boiling. Its composition is $C_{15}H_{14}O_4$, whilst Pelletier obtained $C_{17}H_{10}O_4$, and Bolley and Weydler $C_{35}H_{20}O_8$. It appears to be related to santalin.—Am. Jour. Phar., April, 1881, p. 173; from Ber. d. Chem. Ges., xiii, p. 1514.

Alkannin—Use as a Test for Magnesium Salts.—F. V. Lepel finds that the coloring-matter obtained from the roots of *Anchusa tinctoria* dissolved in a mixture of alcohol (2 parts) and ether (1 part), and diluted with water, exhibits an absorption spectrum composed of three bands. The violet-colored solution produced by the addition of carbonate of ammonium to this mixture is changed to blue by a minute quantity of a magnesium salt, and a characteristic fourth absorption band is formed. By the test 0.05 mgrm. in 1 cc. of liquid can be detected.—Am. Jour. Phar., April, 1881, p. 173; from Jour. Chem. Soc., February, 1881, p. 62.

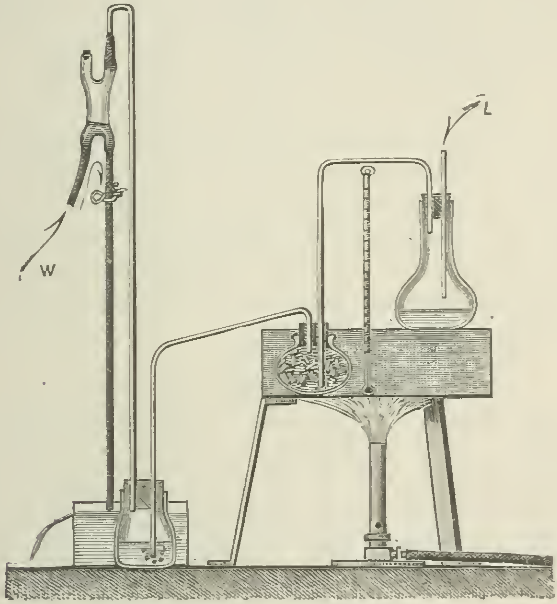
Indigo—Synthesis.—Although it was announced some years ago that the artificial formation of indigo had been effected (see Proceedings, 1879, p. 532), yet the process was so expensive and the yield obtained so trifling that no importance was attached to the announcement. Professor Baeyer has now, however, succeeded in effecting the synthesis in a more direct way and with a yield almost, if not quite, corresponding to the amount calculated. The starting-point is cinnamic acid. This, by appropriate treatment, yields orthonitrophenypropiolic acid, which, by the action of an alkali and reducing agent (glucose), yields indigo. Or, the cinnamic acid is converted into orthonitrophenyloxyacrylic acid, which yields indigotin by the simple application of heat (110° C.). It is possible to produce the indigo directly in the textile fabric.—Am. Jour. Phar., December, 1880, p. 610; from Annales de Chim. et de Phys., October, 1880, p. 286.

Coloring Principle of Rubus Chamæmorus.—Dr. C. O. Cech gives an account of the coloring and dyeing properties of *Rubus chamæmorus*, a dwarf plant with reniform leaves, large white flowers, and orange-yellow berries, which grows plentifully in mossy marshes of Northern Europe, where it is known under the name of "marsh blackberry" (Sumpfbrombeere), and in England as the "cloudberry." Its leaves are used in some parts as a specific in dropsy. Dr. Cech, being engaged in œnochemical researches on the juice of the berries of the plant, noticed that the cotton and woollen cloths used in pressing out the juice assumed an intense orange-yellow color, even at the ordinary temperature, and that the color resisted the action of dilute hydrochloric acid. Experiment showed that cotton and woollen stuffs became durably dyed when immersed for only a few minutes in the juice of the berries. Silk proved more obdurate. The coloring-matter does not, as in most berries, occur only in the skin of the fruit, but the entire berry is penetrated with it. The author is now engaged in preparing a sufficient quantity of the dye in the pure state so as to ascertain its chemical nature.—Chem. and Drug., November, 1880, p. 482; from Jour. f. Prakt. Chem., October 18th, 1880.

New Vegetable Coloring-matter.—S. P. Sadtler and William L. Rowland have isolated a peculiar yellow coloring-matter from a variety of wood called *Beth-a-barra*, which had been recently imported from the west coast of Africa. The new coloring-matter bears some relationship in its character to chrysophanic acid and to chrysarobin, but is nevertheless distinct from these,—to what extent will be the subject of further investigation. It was extracted from the wood (in shavings, sawdust, and raspings) by heating with water containing carbonate of sodium, filtering the claret-red solution, precipitating the coloring-matter, in a fine flocculent condition, by slight excess of acetic acid, washing the precipitate on a filter, and dissolving in 80 per cent. alcohol, from which it crystallized upon cooling. By successive crystallizations the pure substance was obtained. It is tasteless, yellow, and apparently crystallizes in scales or needles, but under the microscope is shown to be made up of a series of flat prisms, joined laterally. The crystals are unchanged in dry or moist air, insoluble in cold water, very slightly soluble in hot water, but readily soluble in alcohol or ether. The presence of even a trace of alkali or alkaline carbonate causes it to dissolve with deep claret-red color. The crystals melt at 135° C, and when dried at 125° C. give analytical numbers corresponding to the formula $C_{28}H_{29}O_5$, or possibly $C_{22}H_{23}O_4$.—Am. Jour. Phar., February, 1881, pp. 49–53.

Flavescin—A New Indicator.—In the course of experiments with commercial alcohol, Mr. F. Lux observed repeatedly that certain samples assumed a deep yellow color on the addition of alkalies, which was again discharged on supersaturating with acids. Thinking that there might be a body present which could possibly be used as an indicator, he investigated the subject, and came to the conclusion that the substance, whatever it might be, was an extractive matter dissolved by the alcohol from the oaken casks in which it was contained. Further experiment revealed the fact that a comparatively much larger quantity of this substance was contained in the wood of those casks which had been burned out, and the fact that a moderate degree of heat aided in the production of this body was further confirmed by a considerable increase in quantity of this substance obtained from oak which had been heated for some hours to 200° C. (392° F.). After numerous trials, the author adopted the following method for obtaining larger quantities of the substance: A broad and low glass vessel (such as the oil reservoir of a kerosene-lamp) is filled with small oak splinters, about 2 to 3 cm. long and a few mm. thick, and closed with a doubly perforated cork. This vessel is connected by glass-tubing with two other flasks (in the manner shown in the cut). The larger flask (on the right) contains some water, and the longer glass tube reaches to within a few cm. over the surface of the water. Both of these vessels are on a sand-bath, that containing the oak splinters being entirely imbedded in sand, while the other is merely placed on top. The temperature of the sand at the bottom should be between 220° and 260° C. (428° to 500° F.). On the other side the apparatus is connected by glass-tubing with a condensing vessel standing in a cooler, and the condenser itself is connected with an aspirator. As will be seen from the cut, the water used for aspiration is at the same time utilized for cooling the condenser. All that is now necessary is to aspirate air through the apparatus. The object of the water in the first flask is to impregnate the air with some aqueous vapor which is requisite for the production of the coloring-matter. After the passage of a moderately strong current of air (about 20 to 25 liters per hour) during five to eight hours. from 100 to 200 cc. of a clear bright-yellow liquid, containing only a few white flakes of a paraffin-like body, is obtained in the condenser. The distillate, which contains besides a small quantity of brown tarry matter some acids (chiefly acetic), is filtered and shaken two or three times with ½ volume of ether.

FIG. 92.



Lux's Apparatus for Producing Flavescin.

The peculiar coloring-matter as well as some of the acids are taken up by the latter; the ether having been evaporated off, a continuous current of air is passed through the contents of the flask, standing on the water-bath at a temperature of 40° to 50° C. (104° to 122° F.) for one or two hours, until all odor of acetic acid has disappeared. There remains now a tough, transparent, but slightly brown-colored mass. This is macerated for several hours with ten to twenty times its volume of cold water, whereby another small quantity of tarry matter is separated. The clear faintly yellow liquid now contains the coloring-matter in tolerable purity and quantity. To prevent its alteration the liquid is mixed with several times its volume of alcohol and kept in well-closed vessels.

Flavescin, dried at 40° to 50° C., appears in form of a tough, transparent, light-brown mass, easily soluble in water, alcohol, and ether, forming, in moderate dilution, almost colorless solution. With soda, potassa, and ammonia intense yellow compounds are produced, which are again decomposed and the color discharged on the addition of mineral and, probably, all other acids. The carbonated alkalies produce also a yellow color, being decomposed into flavescin compounds and into bicarbonates. The latter, however, are not decomposed by flavescin. These properties permit the use of flavescin as indicator: 1, in all acidimetric and alkalimetric determinations; 2, for the determination of caustic alkalies and bicarbonates in presence of simple carbonates; 3, for the determination of carbonic acid in all mixtures and compounds. In the present paper directions are given to facilitate these various applications, for which see New Rem., March, 1881, pp. 73, 74; from Zeitschr. f. Anal. Chem., 1880, p. 457.

Wine-red—Reagent.—Dr. G. Ambühl observes that if pure red wine is heated in a test-tube with a small quantity of tartar emetic, its color is not changed. If it is colored with cherry juice it becomes handsome purple; if with huckleberries, brilliant violet-red; with malva flowers, dirty violet. To determine the presence of these, along with the natural coloring-matter of the wine, some pure wine should be treated alongside of the suspected sample.—Schweiz. Wochenschr. f. Phar., July 16th, 1880, p. 257.

ALBUMINOIDS, ETC.

Albuminoids—Xanthogenic Acid a Precipitant.—Mr. Ph. Zöller observes that the antiseptic and preservative properties of carbon bisulphide and xanthogenic acid stand in a fixed connection with their behavior towards albuminoids. Xanthogenic acid, in fact, is a good precipitant for the latter.—Am. Jour. Phar., September, 1880, p. 468; from Ber. der Deutsch. Chem. Ges., xiii, p. 1064.

Albumen—Test.—Bodeker has proposed the following test for albumen in urine: The urine is to be treated with slight excess of acetic acid, and then with a few drops of a solution of ferrocyanide of potassium. The mixture is then warmed. If albumen is present, even in the smallest quantities, a turbidity is at once produced. On standing for a short time a flocculent precipitate appears.—Chem. and Drug., April, 1881, p. 167; from Arch. d. Pharm.

Albuminates of Copper.—Professor E. Harnack has obtained compounds of egg-albumen and copper containing respectively 1.34 and 2.64 per cent. of the metal. The first is obtained when albumen is in excess, the second when copper is in excess when effecting the precipitation of the compound. The author's experiments lead him to infer that the most probable formula for egg-albumen is $C_{204}H_{322}N_{52}O_{66}S_2$. —Chem. Ztg., April 21st, 1881, p. 268; from Ztschr. Physiolog. Chem.. 5, p. 198.

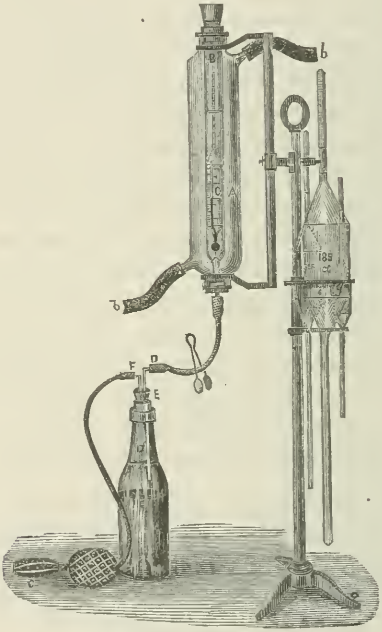
Paralbumin.—Detection.—The test for paralbumin in certain accumulations of fluid in the body is of importance, since its result assists the medical man in forming an opinion as to the source of the liquid. Vulpius recommends that the test be made as follows: 100 grams weight of the clear fluid is diluted with six times its weight of water; if the liquid will not pass through the filter it is diluted with half the above quantity of water before filtration, and if filtration is then found to be impossible it must be allowed to stand until the largest particles have settled. Washed carbonic acid is then passed through the liquid for several hours. The presence of paralbumin is shown by the appearance of a turbidity, which gradually subsides as a white flocculent precipitate. The above dilution is absolutely necessary to secure the ready and full precipitation of paralbumin. Another method consists in adding three volumes of absolute alcohol to the liquid, collecting the precipitate by filtration after twenty-four hours, and washing it with absolute alcohol. After being pressed between filter-paper the precipitate is warmed at 50°–60° for several hours with fifty times its weight of distilled water; any paralbumin present passes into solution, and may be detected by adding thousand-fold diluted acetic acid, by which paralbumin is precipitated, but is redissolved by excess. Paralbumin is further distinguished from metalbumin by yielding no precipitate with sulphate of magnesium.—Jour. Chem. Soc., November, 1880, p. 829; from Arch. d. Phar. (3), 15, pp. 307–310.

Condensed Milk—Estimation.—Experiments have shown Mr. E. Wien that the fat in condensed milk cannot be estimated in the usual manner by evaporation with sand and treatment in an ether apparatus, as the large quantity of sugar present causes the formation of hard lumps which the ether cannot penetrate.

The method he pursues is to place 5 grams of the milk in a dish, and treat it with continually renewed quantities of ether until it is all washed through a filter into a flask; sea-sand is added, and the lumps which form constantly broken up, and the operation repeated until all the fat is completely exhausted; the ether evaporated, the fat redissolved, the ether again evaporated, and the fat weighed. For the nitrogen determination, the author adds gypsum, dries on the water-bath, and proceeds according to the soda-lime process. If the milk be dried in Hoffmeister's dishes, care must be taken not to employ too great heat, as a small loss of nitrogen occurs,—0.2 per cent. Some samples of condensed milk, made in a certain factory, examined according to this method, gave results very close to those obtained by normal milk.—From Biederm. Centr. and J. Chem. Soc.; in New Rem., April, 1881, p. 117.

A New Lactometer.—For the accurate determination of fat in milk gravimetric methods have heretofore alone given reliable results, while the legitimate use of lactometers has chiefly been confined to examinations made with a view to ascertain whether a certain kind of milk was above or below a given standard. Professor Soxhlet, of Munich, has now constructed an apparatus which permits reliable results to be obtained also by the lactometer. The cooler or condensing tube A, which may be revolved about its axis, contains a narrower glass tube B, within which is placed the lactometer C. The lower bulb of the latter carries three projecting points to prevent it from closing the lower orifice. Upon the scale of the lactometer are marked degrees running from 43 to 66, corresponding to the spec. grav. 0.743 to 0.766 at 17.5° C. The lactometer is also provided with a thermometer, graduated in one-fifths, and permitting one-tenth of a degree to be distinguished. To B is attached the flexible tube D, the other end of which is connected with the tube E, as shown in the figure. A shorter tube F, which enters the flask D, is connected with a rubber blowing bulb. The flask D has a capacity of about 300 cc.

FIG. 93.



Soxhlet's Lactometer.

When using the apparatus, 200 cc. of the milk to be tested, which must be made thoroughly uniform by stirring, are first introduced in the flask, then 10 cc. of solution of potassa, and, after thorough agitation, 60 cc. of water-washed ether, all at a temperature of 17.5° C. The flask is immediately stoppered, thoroughly shaken, and set for some time (from one to two hours) in a vessel of water of the same temperature. On standing, the ether will rise to the top, and will contain all the milk-fat in solution. By gentle blowing with the bulb C, the ethereal layer is driven through the tube D into the glass tube B, where it will cause the lactometer to float as soon as a sufficient quantity has entered. The pinch-cock in the flexible tube D having then been closed, the tube B is likewise closed with a stopper. To preserve the temperature of the ethereal liquid, the wide outer tube A is previously filled with water. As soon as the spindle floats freely, and the temperature is correct, the degree on the scale is read off, for which purpose the lower curve of the meniscus is observed. If the above temperature cannot be obtained, it is necessary to add, for each degree of temperature above 17.5° C., one degree on the scale, and for every degree of temperature below 17.5° C., to deduct one degree on the scale. After the experiment the apparatus is washed out with ether and dried.

The reliability of the results obtained with this apparatus is shown by the fact that they differed from those obtained by gravimetric methods by only 0.07 per cent. The given proportions and temperature have been chosen after careful comparison with others, as those which are the most favorable to accurate results.—From Chemiker Zeitung, 1881, No. 1; in New Rem., May, 1881, p. 134.

Koumys—New Method of Preparation.—Mr. Power, after trying the action of various ferments with little or no success, reflected that milk contains in itself the elements of fermentation (casein and sugar of milk), and that the exclusion of the atmosphere and retention of the carbonic acid produced, at a suitable temperature, would fulfil all requirements and yield excellent koumys. His experiments prove the correctness of this supposition. Milk fresh from the cow is put into clean soda-water bottles, filled nearly to the top, tightly corked, and the cork secured with cord or wire. It is kept at a temperature of about 70° F., and shaken every day for ten to eighteen days, being fit to drink in ten days. After eighteen days the quantity of carbonic acid becomes so considerable that a siphon-tap must be used to decant it. Precaution must be observed to maintain the temperature tolerably uniform at 70° F., and to prevent the explosion of the bottles.—New Rem., November, 1880, p. 333; from Min. Wat. Trade Review and Guardian.

Koumys—Preparation.—The following formula for the preparation of koumys is taken from the "Apotheker Zeitung:" Take 9 liters of good skimmed cow's milk, not over eighteen hours old, pour it into a stoneware pot of the capacity of 16 liters, and place the latter in a room free from dust, at a temperature of 18°–25° C. (= 65°–77° F.). Then dissolve 500 grams of milk-sugar and 250 grams of grape-sugar in 3 liters of hot water, filter, allow to cool, and add the solution to the milk. Then add 40 grams of good yeast and 2 liters of already prepared koumys, which, for this purpose, is purchased for the first operation. Stir the whole mixture once every hour during the day, and, after two or three days, when it begins to separate into 3 layers, add 500 grams of good Malaga wine and 50 grams of cognac. Stir again, transfer at once to strong bottles, cork them with good, previously soaked corks, and tie them down. Let the bottles stand for a short time in the same room, then place them in the cellar on their side. A large stock should not be prepared, since it easily turns sour. But if prepared carefully, according to the preceding process, it keeps well for two or three months.

Pepsin, Albumen, and Albuminoids—Action and Behavior of Tannin.—Dr. L. Lewin has made comprehensive investigations upon the action and relation of tannin to animal substances. The well-known property of the tannin of nutgalls to precipitate dissolved albumen, albuminoids, gelatin, etc., is of particular interest pharmacologically. These precipitates are insoluble in water, but soluble in moderately concentrated acetic acid, also in an excess of solution of albumen or gelatin (the resulting solution has a faintly acid reaction), in dilute lactic acid, and finally in carbonated and caustic alkalies. Tannin loses its property of coagulating gelatin and albumen after it has been mixed with an alkali to faint alkaline reaction. Such an alkaline tannate ceases to act, perceptibly, upon albumen, but still possesses the peculiar astringent taste characteristic of tannin when put on the tongue.

Pepsin as well as peptone, in solution in water, behave exactly like albumen. Previous observers have partly misinterpreted the action of tannin in the stomach, in presence of those bodies, because they failed to take account of the simultaneous presence of hydrochloric acid. For, if tannin is added to a solution of pepsin, a precipitate is formed which only requires a little, say 0.1 per cent., hydrochloric acid to dissolve it. The same is the case with peptone. And, if the solution of these bodies has been previously made acid, even by so small a quantity of hydrochloric acid as is normally present in the stomach, a precipitate is not produced at all.

Artificial digestion of fibrin or albumen by pepsin and hydrochloric acid, in presence of tannin, takes place normally, entirely uninfluenced by the latter. Nor is the tannin at all changed, a fact which the author of the paper we quote from has conclusively proven, by estimating the amount of sugar present before and after digestion. Tannin would split up into gallic acid and sugar. Experiment proved that the quantity of sugar present after digestion was the same as was contained in the original sample of tannin employed. (Commercial tannin is hardly ever entirely free from sugar.)

The conclusions of the author are, that the artificial digestion of albumen remains unaffected by the presence of tannin; that the latter does not prevent the formation of peptone, and does not precipitate the pepsin, and that these facts are to be ascribed to the presence of free hydrochloric acid —New Rem., October, 1880, p. 303; from Virchow's Archiv, lxxxi, p. 78.

Natural Gastric Juice.—A. F. W. Neynaber draws attention to a suggestion made by Professor Liebig, that the natural gastric juice, as obtained from the cleaned stomachs of sheep by scraping off the mucous membrane, be dispensed in the form of an emulsion. The scraped mucous membrane is to be rubbed and pounded in a mortar until it has all been passed through a hair-cloth sieve in a manner similar to pulp of tamarinds. This is then worked into an emulsion to be dispensed as such. Mr. Neynaber considers it a settled fact that a certain percentage of wine or alcohol is not injurious to the medical properties of pepsin or gastric juice, and believes that a portion of alcohol added to the pulp direct might serve a good purpose in its preservation.—Drug. Circ., November, 1880, p. 195.

Pepsin—Preparation.—Mr. William A. Wrenn describes the various processes of preparing pepsin, and gives the comparative values of commercial pepsins as determined by the ov-albumen test. He recommends a method for the preparation of pure pepsin, which is essentially that of E. Scheffer, but differs in that no hydrochloric acid is used with the distilled water for the extraction of the mucous membranes of the fresh stomachs, and in that the expressed pepsin precipitate, obtained by the addition of common salt, is redissolved in water and then precipitated by alcohol; this precipitate is pressed, allowed to become air dry, then completely dried at 90° F. and reduced to fine powder. This he considers to be as nearly in a state of purity as it is possible to be. When using the coagulated egg albumen for the test, it is most conveniently reduced to a uniformly fine condition by pressing it through a piece of perforated tin, having very small holes.—Chem. and Drug., May 14th, 1881, p. 204; from Proc. Chemists' Assistants' Association, March 16th. 1881.

Pepsin—Preparation.—Referring to his previous paper, in which he gave a mode of testing pepsin (see Proceedings, 1880, p. 360), A. Petit reviews the various processes that have been suggested for its preparation, and recommends the following as the best in his experience: The stomachs of pigs, calves, or sheep are carefully washed with water, and the mucous membrane, separated by scraping with a rounded knife, is cut as small as possible and put to macerate in four times its volume of distilled water, to which is added 5 per cent. of alcohol. The mixture is agitated every half hour. After four hours' maceration the liquor is filtered and evaporated at a temperature not exceeding 40° C., in vessels exposing a large surface and in a well-ventilated place, so that a renewal of the atmosphere takes place readily. Operating with fresh pigs' stomachs that had not undergone any alteration, and taking the most minute precautions during evaporation, the author succeeded in preparing pepsins converting into albuminose one thousand times their weight of strongly dried fibrin. With sheep's stomachs the activity of the pepsin preparation is about one-tenth.—Phar. Jour. and Trans., July 17th, 1880, pp. 47–50; from Jour. de Phar. et de Chim. (5), vol. ii, p. 85.

Pepsin—Examination of Commercial Specimens.—Dr. O. Lietzenmayer has subjected two specimens of German pepsin to comparative examination, and found them both to be good preparations, both as regards their physical characters and digestive qualities. He found, incidentally, that it is not a matter of indifference whether the egg-albumen has been simply heated to coagulation or has been subjected to prolonged heat. In the latter case it always takes much longer for its conversion into peptone. The above observation is here brought to notice, not so much on account of its immediate importance, but because there is a tendency, in some of the papers that have recently appeared, to throw doubt and discredit upon the character and value of peptonizing agents in general.—Arch. d. Phar., March, 1881, p. 207.

Pepsin—Intervention of Citrate of Ammonium to Effect Solution.—Mr. A. F. W. Neynaber states that citrate of ammonium will enable the complete solution of saccharated (and other) pepsin, which, he finds, are frequently imperfectly dissolved by water. He is not prepared to state, however, whether the pepsin suffers or not by the presence of that compound. One ounce of citric acid, neutralized with ammonia, is sufficient to dissolve 1 ounce of saccharated pepsin completely in certain elixirs.—Drug. Cir., October, 1880, p. 182.

Pepsin and Peptone.—Dr. Maly holds the view that pepsin, which, at best, is a very uncertain substance, being often only mucus mixed with more or less starch, etc., should be replaced by the substance on the formation of which its action mainly depends, namely, peptone. He believes that this is the more rational proceeding, because the sick organism, by the introduction of peptone, at once receives that which it required for its sustenance. Pure peptone is best prepared as follows: The boiled whites of eggs, cut up, are digested in water which, corresponding to the acidity of the stomach, contains $\frac{2}{10}$ per cent of hydrochloric acid; a good pepsin preparation is then added, and a moderately warm temperature is maintained for several hours. The turbid liquid produced is boiled and then filtered and concentrated to the consistence of syrup; alcohol is now added, the precipitate being allowed to remain in contact for some time, and then redissolved in water; this is repeated several times, the final precipitations being fractional.

Pure peptone is odorless and tasteless; it is soluble in water and resembles gum in its physical characters. Its composition is identical with that of albumen, from which, however, it differs in many of its characters:

1. Peptone solution, when mixed with potassa solution and sulphate of copper, produces a handsome rose-red liquid, whilst albumen produces a blue-violet coloration under the same conditions.

2. Peptone is no longer coagulable either by heat or by acids, a property upon which its value chiefly depends.

3. By the action of nitric acid peptone is converted into nitropeptone, but remains in solution. Albumen, under the same circumstances, is precipitated.—Phar. Centralh., August 26th, 1880, pp. 303–305; from Wien. Med. Bl., 1880, No. 31, p. 32.

Meat-Peptones—Characters.—P. Chapoteaut reviews the characters of meat-peptones of different origin as follows:

1. *Pancreatic Peptones.*—These are made, not with pancreatin, but by causing the pancreas of the pig to act upon meat contained in water acidulated with hydrochloric or lactic acid, and kept at a temperature of 30° to 40° C. This method requires considerable quantities of pancreas, and, in spite of this, does not accomplish more than a partial digestion. Besides, the heating must not be kept long, as otherwise the whole would undergo decomposition.

But supposing the digestion to be complete, which is not the case, the peptones thus produced are always accompanied by the digested membranes of the pancreas itself, and these foreign products constitute always a considerable portion of the total peptone obtained. It should also be remembered that it is very difficult to preserve the pancreas of the pig, and that when it begins to change, it gives off a nauseating odor, which enters the peptones prepared with it. The taste of most of these preparations is disagreeable, and they alter rapidly. . .

2. *Pawpaw-juice Peptones.*—These products are obtained by digesting meat with the juice extracted from the trunk, leaves, or fruits of the pawpaw tree, *Carica Papaya.*, L., native of the West Indies and cultivated in the tropical parts of the American continent. This juice

contains as active principle chiefly the papaïne of Wurtz, the properties of which approach very closely to those of animal pancreatin. It also contains an oily substance of disagreeable odor and taste, very sticky, which is an excellent vermifuge in doses of 2 to 4 centigrams ($\frac{1}{3}$ to $\frac{3}{5}$ grain). This liquid has a very irritant action, and may have serious effects upon the mucous membrane of the stomach. The solvent power of pawpaw-juice is very feeble: 10 centigrams (1.5 grains) of meat require 0.25 to 1.00 gram (4 to 15½ grains) of the juice for digestion.

These peptones appear, therefore, to offer no special practical interest. Experiments made with the peptones produced by this method have shown that they are precipitated by nitric acid, which shows that the meat is more or less altered, but not completely digested.

3. *Pepsic Peptones* are not yet to be found in the market. The causes are: first, the high price of the pepsin, and, second, its feeble digestive power.

If it is established that 1 gram of commercial pepsin digests 50 grams of fibrin dried on paper or on linen, it does not follow that it can digest the same amount of meat; indeed, 1 part of this same pepsin transforms into peptone not more than 3 parts. Yet these pepsic peptones keep well, and have an aromatic odor and an agreeable taste. On comparing them in this direction with the pancreatic peptones, there can be no doubt but that they will be preferred to the latter. To prepare them commercially the following problem is to be solved: To prepare, at a low price, a pure pepsin having an enormous digestive power, capable of dissolving 700 to 800 times its weight of meat, and introducing into the peptones only a trifling amount of foreign matters. When this is accomplished, another step may be taken; namely, to eliminate, as has been shown by Dr. Henniger, the acid which serves to facilitate digestion; and then it will be possible to obtain products almost entirely pure. The author of this paper has manufactured, in the laboratories of Rigaut and Dusart, exceptionally powerful pepsin (dissolving from 15 to 1800 times its weight of fibrin), hence the above problem became comparatively easy to solve.—New Rem., October, 1880, p. 298; from Jour. Soc. de Med. et Pharm. de la Haute-Vienne, 1880, p. 108.

Papaïne—Characters, etc.—In a former paper (see Proceedings 1880, p. 175) A. Wurtz and Dr. Bouchut described this ferment prepared from the milky juice of *Carica Papaya*, and stated that it appeared probable that a fresh quantity of papaïne was formed by the action of water upon the coagulum. Mr. Wurtz now describes the experiments undertaken with the object of settling this and other points. These demonstrate that the pulp, after being freed by washing from soluble ferment that may be adherent to it, still yields, by the action of water, a ferment capable of digesting fibrin. Also, that alcohol precipitates from papaw-juice, fresh or digested with water, a principle of variable composition, but that the product, purified by dialysis, approaches in its composition that of albuminoid substances. To the characters previously attributed to this substance the author adds some additional ones, which relate to papaïne purified by the aid of subacetate of lead. It is very soluble in water, in which it is capable of dissolving in less than its own weight. The solution, even when dilute, forms, upon agitation, an abundant froth. The crude papaïne, redissolved, leaves sometimes an insoluble white residue. Solution of papaïne becomes turbid upon boiling, without coagulating like albumen. When left to itself during several days it becomes turbid, and if then examined under the microscope, is found to be full of vibriones and bacilla. In its relation to acids and metallic salts it shows nearly the same characters as albuminoid matters in general, differing, however, in some particulars, and particularly in respect to corrosive sublimate and subacetate of lead, neither of which produce an immediate precipitate, and the latter not even on boiling. In its action upon albuminoid matters papaïne approaches the pancreatic ferment named "trypsine" by Kühne, who has made a careful study of it. The author, furthermore, determined in the papaw-juice a fatty, saponifiable substance and a crystallizable, nitrogenous principle in white mamelons.—Phar. Jour. and Trans., August 14th, 1880, p. 129; from Compt. Rend., xc, p. 1379.

Dr. Albrecht (in Correspondenzblatt fur Schweizer Aerzte) speaks highly of a "syrup of papaïne," the strength or preparation of which is, however, not given. It was found particularly useful in the treatment of children suffering from indigestion and from catarrhal troubles of the stomach and bowels. The syrup was found very useful, also, in the cases of infants that are nourished with infant foods or such as are overfed by the breast; also in the treatment of dyspepsia of adults, eight cases being mentioned in which the remedy was administered with success.—Phar. Centralh., December 2d, 1880; from Wien. Med. Bl., No. 48, 1880.

Papaw-juice—Action upon Starch.—Mr. H. J. Rose, whose attention was attracted to the alleged peptonizing agency of papaw-juice while in Jamaica, brought on some of the juice, and has made a number of preliminary experiments which seem to show the peculiar ferment contained in it to be capable of acting as diastase. Starch-paste, subjected to its action, becomes thin, and, after a greater or less length of time, depending upon the proportion of starch and ferment, loses its property of becoming blued by iodine.—Canad. Phar. Jour., October, 1880, p. 59.

Digestive Ferment in the Common Fig Tree.—Bouchut states that the common fig tree contains a digestive ferment which is similar to that of Carica Papaya. 5 grams of the milky juice, collected in April, produced, when coagulated, a resinous mass and watery fluid. It was heated to 50° C. with 10 grams of fibrin in 60 grams of water. After twelve hours the fibrin was dissolved, leaving an insignificant whitish residue. At intervals additional quantities of fibrin, in portions of 10 to 15 grams, were added, until 90 grams of fibrin had been dissolved altogether, each portion requiring less than twenty-four hours for solution. The process was ended after one month, the liquid keeping well during that time, and maintaining the pleasant odor of good bouillon.—From Comptes Rend., and Chem. Centralbl. (xi), p. 600; in Phar. Centralh., October 28th, 1880, p. 393.

Pancreatic Ferments.—According to A. Bechamp the *microzymes* are readily obtained, particularly in winter, by grinding the pancreatic gland with water containing a little alcohol, and by filtering and washing. Obtained from the pancreas of the ox, they resemble beer yeast in appearance. They are freed from a layer of fat by treatment with ether, and from all soluble substances by washing with water. Viewed under the microscope, they are scarcely 0.0005 mm. in diameter, are free from bacteria, have a gray-brown color, liquefy starch paste very rapidly, and impart to water by maceration the same property. From twenty beef pancreas the author obtained 130 grams moist microzymes, containing 12 per cent. of dry substance. Of these, 3 to 4 grams would dissolve 36 to 45 grams moist, but well-pressed fibrin in one or two hours; casein, musculin, and acid albumen (prepared from fuming hydrochloric acid and albumen) require a somewhat longer time. The pancreas peptone differs from the peptone of the stomach, in the former producing, with albuminoids, crystalline compounds like leucin, etc. From 15 grams dry fibrinin and 6 grams pancreatic microzyme (0.8 gram dry substance) 2.5 grams crystallized products were obtained. The active substance of the pancreatic gland has been named *pancreazymase.* The microzymes do not lose their activity by acting upon albuminoids, but may be used again. Acting even upon casein, not the slightest trace of putrid odor is observable after twenty-four hours. The author regards the microzymes as cells with soluble contents in an insoluble cell, the former being capable of penetrating the latter.—Am. Jour. Phar., May, 1881, p. 247, and Chem. Centralbl., 1881, p. 152; from Compt. Rend., 92.

Yeast—Action upon Iodide of Starch.—Professor J. Wiesener observes, that living or active yeast has the remarkable property of preventing the combination of iodine and starch to blue iodide of starch; and this property makes the detection of the adulteration of yeast by starch exceedingly difficult. On testing a sample of yeast containing 50 per cent. of starch, by the addition of a large excess of aqueous solution of iodine, faint transient colorations are observed, which, however, rapidly disappear, and thereby might produce the impression that only minute traces of starch are present in the yeast. But even the presence of only 5 per cent. of starch seriously interferes with the normal iodine reaction. If yeast were known to produce or separate an alkaline substance, the above phenomenon could be readily explained; but it continually separates (according to the author's investigations) an acid compound, as long as it has life. Exhausted or dead yeast does not in the slightest degree interfere with the iodide of starch reaction. In order to detect starch in yeast, the latter must be made inactive, which may be accomplished by boiling. The quickest way, however, to detect starch in yeast is by means of the microscope.—New Rem., November, 1880, p. 324; from Dingler's Polyt. Jour., 237, p. 400.

Fermentation—Influence of Oxygenated Water (Eau Oxygénée).—By the addition of oxygenated water (method of preparation not given) to various easily fermentable or putrefying liquids, such as milk, urine, wine, albumen, egg-yellow, etc., Dr. Regnard has found that they may be preserved unchanged for a considerable time. The liquids remained intact after one month, not a trace of fermentation or putrefaction being evident, while samples of the same liquids not so treated had putrefied and possessed an intensely fetid odor. The color of the wine was changed to that of old Malaga (onion color; the original color is not stated); the milk was not even coagulated, and gave the reactions of the fresh article. Cherries assumed the color of those preserved in alcohol. Indeed they contained considerable quantities of that liquid.—Phar. Centralh., February 10th, 1881, p. 74; from Wien. Med. Zeit., No. 45.

Rapid Fermentation.—J. Boussingault describes a laboratory process for hastening the process of fermentation. It is well known that the rate of fermentation decreases as the quantity of alcohol in the liquid increases. The author has found that when a vessel, in which the process is going on, is placed in a water-bath at 40° C., attached to an air-pump, and exhausted to near the boiling-point of the liquid, the alcohol vapor can be condensed in a receiver cooled by ice, and the process of fermentation is much hastened. A hundred parts of sugar were completely fermented in six hours in this apparatus; under ordinary conditions 74 parts of sugar were still unchanged.—Drug. Circ., December, 1880, p. 215; from Compt. Rend.

REPORTS OF COMMITTEES.

REPORT OF THE COMMITTEE ON THE DRUG MARKET,

FOR THE FISCAL YEAR ENDING JUNE 30TH, 1881.

BY LOUIS LEHN, OF NEW YORK, CHAIRMAN.

The drug trade of the past year has fully shared the general prosperity of the country. It has not been disturbed by wild speculation as in the preceding year, but the steadily increasing demand has been well met by ample supplies, while the prices have generally been in favor of the buyers.

In the following we will attempt to recapitulate the changes of the more important staples and new remedies, and to mention the novelties which have been brought to the notice of the medical and pharmaceutical professions, for the past year:

Acid benzoic, *ex gum* and *ex urine*, have both steadily declined, and have probably now reached the lowest point.

Acid boracic has lately received more attention as an antiseptic, and is sold at a very low figure.

Acid chrysophanic continues to be in good demand, and is supplied by European manufacturers at reduced figures.

Acid citric has had its usual share of advances and declines. The prediction that it would reach its old price of $1 again during 1880 to 1881 has not been verified; the manufacturers have met the demand with ample supplies.

Acid salicylic continues in good demand at established figures; for medicinal use its soda salt seems to be preferred to the acid.

Acid sclerotinic, from ergot, seems to be preferred to ergotin by some; its high price, however, appears to prevent its more general use.

Acid tartaric has followed the decline of cream of tartar, and is now selling at a lower figure than it has been selling for a number of years.

Amber continues to be exceedingly scarce and high in price.

Anise seed, star, is said to have been adulterated to some extent with Japanese star anise; it is claimed by some that the latter is poisonous, while others assert that the Chinese and Japanese varieties are identical.

Aspidospermin, the alkaloid of the quebracho bark, has so far found but little application, probably on account of its high price; the citrate is the most soluble of its salts, and is crystallizable.

Balsam copaiba, of all grades, has continued in its upward movement, and has reached a higher figure than it has had for some years; it is expected that the new supplies, which are to arrive shortly, will produce a decline.

Balsam Peru has steadily advanced, and has probably now reached its highest point, $3.50 to $3.75, as new and cheaper supplies are said to be near by; adulterations seem to be more frequent.

Borax advanced in December to 13 cents, from which figure it declined but a trifle since.

Caffein, *citrate* and *pure*, continue to be largely used, while the prices remain unchanged.

Calabar beans are plentiful at low prices.

Camphor has again deceived its patrons. It commenced to advance in the fall of last year, reached its highest point in the middle of winter, and began to decline when the heaviest spring demand set in, and at the present prices the refiners say they are selling at a loss.

The imports of crude camphor at New York, during twelve months ending June 30th, 1881, were 2,010,165 pounds, at a value of $350,503.

Cardamoms, *Aleppy* and *Malabar*, have arrived in well-assorted lots, and are selling at moderate prices.

Carica Papaya, the dried juice of the unripe fruit of, from Brazil, has attracted considerable attention of late; it is said to possess extraordinary digestive properties similar and superior to those of pepsin. On account of its difficult collection the juice is still very scarce and high in price, so that but few experiments have been made with it; larger supplies are expected shortly.

Castor fiber continues very scarce, and high prices must be paid for small lots as they are offered in the market.

Cinchona barks have again played an important part in the drug centres of the world. All grades of good barks have been scarce and high in price; a few months ago, however, the welcome news reached us that large forests of cinchona trees, which all along had been looked upon as furnishing only a very inferior bark, had been found to furnish a bark yielding 1¾ to 2 per cent. of pure quinia, and that at least one year's supply was on its way to Northern and European ports. If this information is confirmed, we may look for lower prices of the barks as well as of the cinchona alkaloids. The imports of medicinal barks at New York, for the twelve months ending June 30th, 1881, were 3,095,612 pounds, at a value of $819,899.

Cinchonidia dihydromide, *cinchonidia salicylate*, and *cinchonidia tannate* are the latest novelties of cinchonidia salts.

Cinchonidia sulphate has participated in the downward tendency of quinia, and is now cheaper than it has been for some years past.

Coca leaves have been in steady demand; prime leaves have been rather scarce and high in price.

Cream of tartar has not undergone many changes during last year; its price ranged from 34 to 32 cents, at which latter figure it is selling now.

Cubebs have steadily advanced, and are higher in price now than they have been for some years past.

Damiana is still being in moderate demand; the California variety is now used exclusively.

Duboisina Sulphate.—The effects of this comparatively new alkaloid seem to be generally understood, judging from the increased demand; its price is considerably lower than last year.

Elaterium continues scarce, and its price is higher than before.

Ergot of rye has been in good demand throughout the year at a moderately high price; recently a slight advance has taken place.

Eserine salicylate is the only truly crystallized salt of eserine, and is worthy of notice on this account, as it guarantees the highest degree of purity; not being hygroscopic, but very stable, it is a good salt for dispensing.

Eucalyptol, a volatile liquid from eucalyptus leaves, has attracted considerable attention. Two varieties are offered in the market: one, a yellowish liquid, comes from Australia; the other, a white liquid, is imported from Europe.

Flowers, Medicinal.—The crop of last year was, as was to be expected, only a limited one as to quantity, while the quality was even inferior to that of the year previous; as a consequence prices advanced considerably. The reports of this year's crop, as far as received, are very favorable, both as to quantity and quality.

Flowers, arnica, were reported scarce at first, and prices advanced accordingly, but on the arrival of larger supplies a decline followed.

Flowers, chamomile, German and Roman, were only of medium quality at comparatively high prices.

Glycerin has advanced in price almost 100 per cent. since last year, and there is no prospect of a decline, as the crude material is still advancing.

Guarana has been in steady demand at very low figures; a slight advance has taken place recently.

Gum acaroides, a resin from Australia, has recently made its appearance in the European and our markets. It resembles, when heated, benzoin in smell, and, since it is much cheaper than benzoin, it will undoubtedly often be used as a substitute for that resin.

Homatropine bromide continues to be in good demand; since it is pretty generally introduced, and manufactured on a larger scale, its price has been reduced about one-half.

Hydroquinone has lately been recommended as an antiseptic.

Hyoscyamine.—The demand for both the amorphous and the crystalline has increased considerably; the sulphate has also been used to a certain extent. The price has remained the same.

Hyoscine iodide, from Hyoscyamus niger, is a new alkaloid discovered by Professor Ladenburg. It is recommended by Professor Edlefsen, of Kiel, as a remedial agent in asthma, whooping-cough, and in colic.

Iodine and its salts have attracted considerable attention by their unusually low price; it is expected by some that an advance will soon take place.

Jaborandi-leaves, of ordinary and medium grades, have been supplied in very large quantities, and the price has been a very low one in consequence, while prime green leaves have been rather scarce.

Jamaica dogwood (Piscidia Erythrina), the bark of the tree, has lately been introduced as a narcotic and hypnotic; whether it will be found as efficacious as is claimed by some remains still to be seen.

Lactucarium continues scarce and high in price.

Manaca (Franciscea uniflora, the wood of), another new remedy from Brazil, has made its appearance lately; it is recommended for rheumatism and syphilis.

Mercury has sold at about the same price all the year round, with occasional advances and declines.

Menthol.—There is a limited demand for this form of oil of peppermint, and the price has been reduced somewhat.

Morphia and its salts have naturally followed the course of opium; it is now selling $1 lower than this time last year.

Opium.—The opium market of the past twelve months has passed through a number of exciting changes, but, on the whole, has followed a downward tendency. At the beginning of the fiscal year, when the first reports had arrived, that the new crop would not reach one-half of last year's crop, a quick advance took place; when more favorable news of a larger crop came the price declined. Then came the report of the formation of a syndicate, which intended to concentrate the stock into a few hands, which caused another advance; this was followed by another decline, which has continued ever since, and was hastened by the news that the new crop would be larger than it had been for years past.

The imports of opium at the port of New York, from June 30th, 1880, to June 30th, 1881, amounted to 131,624 pounds, at a value of $746,442.

Papayotin or *papaïne* is the name given to the purified juice of Carica Papaya. It is said to possess the remarkable digestive properties of the juice in a still more marked degree. It is to be regretted that the difficulty with which the juice is obtained prevents the production of larger quantities of papayotin, which is still very scarce and high in price.

Pilocarpine and its salts are now very extensively used, and seem to be generally preferred to other preparations of jaborandi.

Quebracho Bark.—It is now generally conceded that the bark of the Aspidosperma Quebracho (Quebracho blanco) possesses the most medicinal virtues, and is therefore generally called "True Quebracho Bark." The demand for the bark has increased considerably, and the large supplies which have been sent from South America, have reduced the price to a reasonable one.

Quinine dichloride is the latest novelty in quinine salts; it is recommended for hypodermic injections.

Quinine Sulphate.—Since the removal of the tariff duty of 20 per cent. quinine has become cheaper from year to year, and, if the increased supplies of cinchona barks from South America continue, still lower prices may be looked for.

The imports of quinine and its salts, from June 30th, 1880, to June 30th, 1881, were 246,483 ounces, at a value of $624,716.

Resorcin, or metadihydroxyl-benzol, obtained by the action of alkalies upon resins, such as galbanum, ammoniac, and others, is a new antiseptic, which has attracted considerable attention of late; it is said to possess similar properties to carbolic acid, and to be non-poisonous.

Salicin has followed the downward tendency of quinine, and is now cheaper than it has been for some time.

Soda borosalicylate and *soda taurocholate* are two new pharmaceutical soda salts.

Sulphur hypochlorite, a yellowish powder, resembling flower of sulphur in appearance, has lately been imported from England for skin diseases.

Tripolith has been recently introduced from Germany as an article superior to plaster of Paris for surgical bandaging.

Vanilla beans, both Bourbon and Mexican, have been supplied throughout the year at very low figures; the report that the new crop was rather a short one has caused an upward movement.

REPORT OF THE COMMITTEE ON LEGISLATION.

Since the last meeting of the American Pharmaceutical Association the legislatures of a number of States had pharmacy laws before them for consideration, and it is a matter of regret that in three of the principal States near the Atlantic coast the bills failed to pass. In *Massachusetts*, where a bill had been framed by the Essex County Druggists' Association, considerable opposition was encountered and much unjust ridicule was heaped upon the advocates of the measure, which was finally defeated by a vote of 96 noes against 88 ayes. In the State of *New York* a bill has been prepared by a committee of the New York State Pharmaceutical Association, which likewise failed to become a law. In *Pennsylvania* no less than four bills affecting pharmacy were before the legislature. Of these one had been drafted by a committee of the Pennsylvania Pharmaceutical Association, and was reported with a negative recommendation by the committee on the judiciary general, but was recommitted and reported favorably; when up for final passage in the House it received only 46 affirmative votes. A second bill did not make any provision for examination or registration, but simply declared those as qualified to compound prescriptions, who are graduates in medicine or in pharmacy, or who have had at least three years' practical experience in the compounding and dispensing of medicines. A third bill aimed at regulating the practice of pharmacy in the county of Alleghany, and a fourth bill, which was negatively recommended, would have compelled physicians to write their prescriptions in the English language, and pharmacists to attach a copy of such recipe compounded to the bottle or package. Pharmacy bills before the legislatures of Kansas and California likewise failed to pass.

On the other hand it is gratifying to state that the State of Arkansas has enacted a *poison law*, requiring the registration of all sales at retail of arsenic, strychnia, corrosive sublimate, hydrocyanic acid, oil of bitter almonds, croton oil, oxalic acid, mineral acids, and opium and their preparations (paregoric is excepted); and that the following laws regulating the *practice of pharmacy* have been enacted since our last meeting.

Connecticut.—The governor appoints three commissioners of pharmacy, of whom one is a physician, and two are pharmacists, recommended by the Connecticut Pharmaceutical Association. Licenses are granted not only upon a pharmaceutical diploma, but also upon the certificate of qualification given by some reputable pharmacist, and based upon an experience of not less than three years; the charge for the license is three dollars, and for the renewal thereof annually two dollars. The law contains also provisions against adulterations, and for the registration of the sales of the three poisons, arsenic, strychnia, and prussic acid. The present commissioners are Emil A. Gossner, Pliny A. Jewett, M.D., and Stephen Goodrich.

Illinois.—The Illinois Pharmaceutical Association recommends pharmacists of not less than ten years' practical experience, and the governor appoints five to constitute the board of pharmacy. The law is not retroactive as to the examination of proprietors, but it permits the registration of graduates in medicine as pharmacists. The registration fee is two dollars, and the renewal thereof annually is not to exceed two dollars. The law also contains a section against adulterations, and one requiring the proper labelling of a number of poisons. The present board is constituted as follows: George Buck, president. Chicago; John E. Espey, Bloomington; Herman Schroeder, Quincy; Charles W. Day, Allendale; Frank Fleury, secretary, Springfield.

Missouri.—The board of pharmacy consists of three pharmacists of not less than five years' experience, and having resided in the State at least five years, and is appointed by the governor with the advice of the senate. The law is not retroactive, and permits the registration of physicians as pharmacists without examination. The fee for registration is two dollars, and for examination and registration five dollars; an annual renewal of registration is not required, but itinerant vendors of drugs, etc., have to procure a license at a cost of one hundred dollars annually. The law also provides for the proper labelling of poisons and registration on selling them; it forbids adulterations of drugs and medicines, and prohibits the sale of alcoholic liquors as a beverage by registered pharmacists. The board is organized as follows: J. A. Howard, Boonville, president; J. F. Hurt, Columbia, vice-president; and M. W. Alexander, St. Louis, secretary.

North Carolina.—The act incorporates the North Carolina Pharmaceutical Association, which elects ten of its members, of whom the governor appoints five to constitute the Board of Pharmacy. The law is not retroactive; it permits the registration of all having had three years' experience at the time of enactment, and also the registration of licentiates of other boards of pharmacy. A clause in section 5 seems to have been intended to provide for the registration without examination of the actual proprietors of drug stores and of graduates in medicine, but in reality relieves them from all responsibilities under this act; the clause is as follows: "*Nothing in this act* shall apply to any person or persons in business on their own account upon the passage of this act, nor to those who are, have been, or may hereafter be regular practicing physicians." A few commonly used medicines, among them laudanum in original packages, and calomel, may be sold by non-pharmacists. The examination fee is five dollars, the registration fee two dollars, and for those in the employ of others one dollar. The board is also empowered to examine into and adjudicate upon all cases of abuse, fraud, adulteration, substitution, or malpractice, and to enforce all the provisions of the law. Section 8 provides against the adulteration of medicines, and section 9 regulates the proper labelling of poisons, and registration of all sales of certain poisonous articles. The Board of Pharmacy is constituted as follows: William H. Green, Wilmington, president; William Simpson, Raleigh, secretary; A. S. Lee, Raleigh; E. H. Meadows, Newbern; and E. M. Nadal, of Wilson.

West Virginia.—The commissioners of pharmacy, three in number, are appointed by the Board of Public Works, and must be residents of the State for five years and have had five years' practical experience. Like those commented on above, this law provides for the registration, without examination, of all engaged in the business at the time of its passage; graduates in medicine are not exempt from examination. The fee for registration without examination is two dollars, and with examination five dollars. Section 7 makes the adulteration of drugs a misdemeanor, and section 9 provides for the registration of the sales of certain poisons, and provides that all poisons be put in black vessels bearing the death's head and cross bones, the name of the article, the word "poison," etc. The commissioners are Edmund Bocking, Wheeling; J. W. L. Baker, Martinsburg; and Ed. L. Boggs, Charleston. Copies of the poison law and of the five pharmacy acts are appended to this report.

A subject of great importance is the purity of drugs. For a number of years the association appointed a special committee on adulterations and sophistications. The reports of these committees have done much good in directing attention to adulterated articles and in preventing or exposing fraud; but they have likewise been quoted as proof of the inferior or sophisticated condition of the great bulk of the drugs in the American market. It is not the purpose of this committee to produce proof that pure drugs, chemicals, and pharmaceutical preparations can without difficulty be obtained from the wholesale dealer as well as from the retailer, and that, the same as in other countries, cupidity will induce certain men to lessen the quality in order to increase their profits. Adulteration of drugs and food is an evil which should receive prompt attention from the lawmakers. The framing of a law which would effectually reach this evil is surrounded with great difficulties, and whether it has been accomplished by the act proposed a year ago by the National Board of Trade, and recently enacted in New York and New Jersey, can only be ascertained by actual experience. This law appears to have certain advantages over the British law on the same subject, and these are to be found chiefly in this, that the State Board of Health is intrusted with its execution, with fixing the limits of variation of quality, with supervising the appointment and discharge of public analysts, and with preparing rules and regulations for collecting and examining articles of food and drugs. The definition of adulteration may be briefly stated to be the reduction of strength or purity in any manner whatever, unless plainly indicated upon the label. If prosecutions are instituted—as appears to be the intention—only upon the authority of the Board of Health, supported by chemical or physical examination, uniformity of the interpretation of the law and in its execution would be secured. The bill had been presented in a number of States, and, though passed only in New York and New Jersey, is likely to be adopted hereafter in other communities. The copy of the adulteration law appended to this report is the one passed in the State of New York; and that of New Jersey is, aside from the enacting clause, almost identical, the modifications being inclosed in ( ) and marked N. J., whilst the few passages contained only in the New York law are inclosed in brackets, thus [ ].

An adulteration of food and medicine act, a copy of which is likewise appended to this report, has also been enacted in Michigan. The law defines adulterations, imposes a fine of not more than fifty dollars, or imprisonment not exceeding three months for violations, and makes it the duty of the prosecuting attorney to attend to the prosecution of all complaints under this law.

Respectfully submitted,

JOHN M. MAISCH,

Chairman Committee on Legislation.

ACT REGULATING THE SALE OF POISONS IN ARKANSAS.

SECTION 1. *Be it enacted by the General Assembly of the State of Arkansas:* That it shall be unlawful for any person to sell, either at wholesale or retail, any of the drugs usually denominated poisons, without distinctly labelling the bottle, box, or packages with the name of the article and the word "poison," together with the name and place of business of the seller.

SEC. 2. It shall be the duty of every person selling a poison at retail, before delivering the same, to make, or cause to be made, an entry in a book kept for that purpose, stating the date of sale, name of poison, quantity, for what purpose, name, sex, or color of the purchaser, or for whom purchased, residence of purchaser, by whom sold. Such book is to be preserved for at least five years after the date of the last entry therein, and to be always open to the inspection of the coroner and the officers of the different courts.

SEC. 3. The following named articles, and those hereafter declared to be poisons by law, shall be considered poisons within the meaning of this act, to wit: Arsenic and its compounds, strychnia and its salts, corrosive sublimate, hydrocyanic acid, oil of bitter almonds, croton oil, oxalic acid, the mineral acids, opium and its preparations, except paregoric and those preparations containing two grains or less of opium to the ounce.

SEC. 4. Nothing herein contained shall apply to, or in any manner interfere with, the compounding and dispensing of medicines and poisons by a medical practitioner, or upon the prescriptions of one.

SEC. 5. Any person who shall violate any of the provisions of this act shall, upon conviction thereof, be sentenced to pay a fine of not less [than] five [dollars] ($5), nor more than ($100) for each offence.

SEC. 6. This act shall take effect and be in force from and after thirty (30) days after its passage.

PHARMACY LAW OF CONNECTICUT.

AN ACT *Relating to Medicines and Poisons.*

SECTION 1. *Be it enacted by the Senate and House of Representatives in General Assembly convened:* The governor shall, on or before the first day of June, 1881, appoint three persons to be commissioners of pharmacy, one to hold office for one year, one for two years, and one for three years; and he shall annually thereafter, on or before the first day of June, appoint one such commissioner, who shall hold office for three years from that date; and any vacancy that may occur may be filled by the governor for the unexpired term. Said appointments shall be so arranged that one of said commissioners shall be a reputable physician, and two of them shall be pharmacists, selected by the governor from six persons to be annually nominated to him by the Connecticut Pharmaceutical Association; and said commissioners shall keep a record of their proceedings, and may give certified copies thereof, which shall be legal evidence.

SEC. 2. No person shall conduct or keep a shop, store, or place of any kind, for retailing drugs, medicines, poisons, or such chemicals as are used in compounding medicines, or compound or dispense prescriptions of a physician, or vend medicines or poisons, unless he shall have been licensed therefor, as hereinafter provided, or under the supervision of a licensed pharmacist.

SEC. 3. The comptroller shall designate a room in the capitol for the meetings of said commissioners, which shall be held in each year, on the first Tuesdays of March, June, September, and December, and at such other times and places as they may deem necessary, to determine the qualifications of applicants for license as pharmacists, and said commissioners shall license, by a certificate signed by them, or by a majority of them, such persons as shall produce satisfactory evidence to them of their qualifications and attainments, either by diploma, granted to the applicant by some reputable college of pharmacy, or by the certificate of some reputable pharmacist, that the applicant has, for not less than three years prior to his application, received instructions in pharmacy, and possesses the necessary qualifications of a pharmacist, or by other satisfactory evidence. Licenses shall specify the name of the person licensed, the date when granted, the city or borough in which he shall conduct his business, and, if in a city, the street and number of his place of business; and his license shall be conspicuously exhibited in his place of business, and shall remain in force until the first day of April, next after said date, unless granted at a meeting of said commissioners on the first Tuesday of March, in which case such license shall terminate on the thirty-first day of March of the succeeding year, or unless such person shall remove his place of business without notice to the commissioners; and a license may be renewed upon the application of the person licensed, upon the terms hereinafter provided.

SEC. 4. Every person, conducting the business of pharmacy, shall, within ninety days after the first day of June, 1881, and on or before the first Tuesday of March, annually thereafter, if then conducting said business, apply to said commissioners for said license, or for a renewal thereof, and establish his rights therefor, by such evidence as shall be satisfactory to them; and they shall adopt forms of application for license, and rules and regulations, prescribing the manner in which the evidence in support of such application shall be presented to them; and they shall furnish such forms, and such rules and regulations to any person upon his request.

SEC. 5. Each applicant shall pay to said commissioners three dollars for his license, and two dollars for the renewal thereof; and said commissioners shall account semi-annually, on the first Monday of January and July, with the treasurer of the State for the sums received by them for licenses, and shall be paid by the State at the time of such accounting the money necessarily expended by them for stationery and printing, and five dollars a day, each, for each day of service, not exceeding twenty days in any one year, and mileage at the same rate as is paid to members of the General Assembly; *Provided*, That if the amounts received by said commissioners for said licenses shall not be sufficient to pay them said sums for services and mileage in full, such amounts shall be apportioned pro rata among said commissioners; and their charges for expenses for stationery and printing, and for services and mileage, shall be audited and approved by the comptroller in the proportion aforesaid, who shall draw his order upon the treasurer therefor.

SEC. 6. Nothing hereinbefore contained shall be construed to prevent a practicing physician from compounding his own prescriptions, or to prevent the sale of proprietary medicines, or of any drugs, medicines, or poisons at wholesale to licensed pharmacists, or for use in manufactures or the arts, or to prevent any person from becoming a partner in, or the proprietor of, a pharmacy conducted by a licensed pharmacist, or any keeper of a country store from keeping for sale and selling such domestic remedies as are usually kept and sold in such stores, but such keeper shall not compound medicines, and medicinal preparations so kept and recognized by the United States dispensatory shall be compounded by a licensed pharmacist and marked by his label.

SEC. 7. Any person who shall wilfully violate any of the provisions of the preceding sections shall forfeit five dollars for each day that he shall continue such violation, one-half to him who shall prosecute to effect, and the other half to the town in which the offence is committed.

SEC 8. The provisions of the preceding sections of this act shall apply only to the cities and boroughs of the State.

SEC. 9. Every person who shall knowingly adulterate or cause any foreign or inert substances to be mixed with any drug, or medicinal substances or preparations, recognized by any pharmacopœia, or employed in medicinal or medical practice, so as to weaken or destroy its medicinal effect, or shall sell such drug, compound, or preparation, knowing it to be so adulterated or mixed, shall be fined not less than ten dollars, nor more than one hundred dollars, and upon conviction, all such adulterated or mixed articles in his possession may be seized upon a warrant issued by the court in which such conviction is had, and destroyed by the officer by whom such seizures shall be made.

SEC. 10. Every person who shall sell arsenic, strychnine, or prussic acid, shall affix to the package sold by him a label, plainly marked with his name, date of sale, and the word "poison," and shall enter in a book kept by him for that purpose, the name of the purchaser, the date of sale, and the quantity sold; which book shall be kept open for public inspection, carefully preserved, and when he shall close his business, or remove from the town in which such business is carried on, or when said book shall be filled with entries, it shall be deposited by him in the office of the town clerk of the town in which he may conduct his business; and any person who shall violate the preceding provisions of this section, or who, when purchasing the articles herein named, shall give a false or fictitious name to the vender thereof, shall be fined not less than ten dollars, nor more than one hundred dollars.

SEC 11. Police courts and city courts having criminal jurisdiction, where established, and justices of the peace in towns where such courts do not exist, shall hear and determine prosecutions for violations of the provisions of this act.

SEC. 12. This act, except so much thereof as provides for the appointment of said commissioners of pharmacy, shall take effect on the first Tuesday of June, 1881.

APPROVED, April 14th, 1881.

PHARMACY LAW OF ILLINOIS.

AN ACT *to Regulate the Practice of Pharmacy in the State of Illinois.*

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly:* That it shall not be lawful for any person, other than a registered pharmacist, to retail, compound, or dispense drugs, medicines, or poisons, or to open or conduct any pharmacy or store for retailing, compounding, or dispensing drugs, medicines, or poisons, unless such person shall be, or shall employ and place in charge of said pharmacy or store, a registered pharmacist, within the meaning of this act, except as hereinafter provided.

SEC. 2. Any person, in order to be registered within the meaning of this act, must be either a graduate in pharmacy, a graduate in medicine, or shall, at the time this act takes effect, be engaged in the business of a dispensing pharmacist on his own account, in the State of Illinois, in the preparation of physicians' prescriptions and in the vending and compounding of drugs, medicines, and poisons, or shall be a licentiate in pharmacy.

SEC. 3. Graduates in pharmacy must be such persons as have had four years' practical experience in drug stores where the prescriptions of medical practitioners are compounded, and have obtained a satisfactory diploma or credentials of their attainments from a regularly incorporated college or school of pharmacy.

SEC. 4. Licentiates in pharmacy must be such persons as have had two years' practical experience in drug stores where the prescriptions of medical practitioners are compounded, and have passed a satisfactory examination before the State board of pharmacy, hereinafter mentioned. The said board may grant certificates of registration, without further examination, to the licentiates of such other boards of pharmacy as it may deem proper.

SEC. 5. The governor, with the advice and consent of the senate, shall appoint five persons from among such competent pharmacists in the State as have had ten years' practical experience in the dispensing of physicians' prescriptions, who shall constitute the board of pharmacy. The persons so appointed shall hold their offices for five years; *Provided*, That the term of office of the five first appointed shall be so arranged that the term of one shall expire on the thirtieth day of December of each year; and the vacancies so created, as well as all vacancies otherwise occurring, shall be filled by the governor, with the advice and consent of the senate; *And provided, also*, That appointments made when the senate is not in session, may be confirmed at its next ensuing session. The Illinois Pharmaceutical Association shall annually report directly to the governor, recommending the first year the names of at least ten persons, whom said association shall deem best qualified to serve as members of the board of pharmacy, and the names of at least three persons each year thereafter, to fill any vacancies which shall occur in said board.

SEC. 6. The said board shall, within thirty days after its appointment, meet and organize by the election of a president and secretary from its own members, who shall be elected for the term of one year, and shall perform the duties prescribed by the board. It shall be the duty of the board to examine all applications for registration submitted in proper form; to grant certificates of registration to such persons as may be entitled to the same under the provisions of this act; to cause the prosecution of all persons violating its provisions; to report annually to the governor and to the Illinois Pharmaceutical Association upon the condition of pharmacy in the State, which said report shall also furnish a record of the proceedings of the said board for the year, and also the names of all pharmacists duly registered under this act. The board shall hold meetings for the examination of applicants for registration, and the transaction of such other business as shall pertain to its duties, at least once in three months; *Provided*, That said board shall hold meetings once in every year in the city of Chicago and in the city of Springfield, and it shall give thirty days' public notice of the time and place of such meetings; shall have power to make by-laws for the proper fulfilment of its duties under this act, and shall keep a book of registration, in which shall be entered the names and places of business of all persons registered under this act, which book shall also specify such facts as said persons shall claim to justify their registration. Three members of said board shall constitute a quorum.

SEC. 7. Every person claiming the right of registration under this act who shall, within three months after this act shall take effect, forward to the board of pharmacy satisfactory proof, supported by his affidavit, that he was engaged in the business of a dispensing pharmacist on his own account in this State at the time this act takes effect, as provided in section 2, shall, upon the payment of the fee hereinafter mentioned, be granted a certificate of registration; *Provided*, That in case of failure or neglect to register as herein provided, then such person shall, in order to be registered, comply with the requirements provided for registration as a graduate in pharmacy or a licentiate in pharmacy within the meaning of this act.

SEC. 8 Any assistant or clerk in pharmacy, who shall not have the qualification of a registered pharmacist within the meaning of this act, not less than eighteen years of age, who, at the time this act takes effect, shall have been employed or engaged two years or more in drug stores where the prescriptions of medical practitioners are compounded, and shall furnish satisfactory evidence to that effect to the State board of pharmacy, shall, upon making application for registration, and upon the payment to the secretary of the said board of a fee of one dollar, within sixty days after this act takes effect, be entitled to a certificate as a "registered assistant," which said certificate shall entitle him to continue in such duties as clerk or assistant; but such certificate shall not entitle him to engage in business on his own account unless he shall have had at least five years' experience in pharmacy at the time of the passage of this act. Annually thereafter, during the time he shall continue in such duties, he shall pay to the said secretary a sum not exceeding fifty cents, for which he shall receive a renewal of his certificate.

Sec. 9. Every person applying for registration as a registered pharmacist, under section 7 of this act, shall, before a certificate is granted, pay to the secretary of the board the sum of two dollars, and a like sum shall be paid to said secretary by graduates in pharmacy, [by] graduates of medicine, and by licentiates of other boards who shall apply for registration; and by every applicant for registration by examination shall be paid the sum of five dollars; *Provided*, That in case of the failure of any applicant to pass a satisfactory examination, his money shall be refunded.

Sec. 10. Every registered pharmacist who desires to continue the practice of his profession, shall annually thereafter, during the time he shall continue in such practice, on such date as the board of pharmacy may determine, pay to the secretary of the said board a registration fee, to be fixed by the board, but which shall in no case exceed two dollars, for which he shall receive a renewal of said registration. Every certificate of registration granted under this act shall be conspicuously exposed in the pharmacy to which it applies.

Sec. 11. The secretary of the board shall receive a salary, which shall be fixed by the board; he shall also receive his travelling and other expenses incurred in the performance of his official duties. The other members of the board shall receive the sum of five dollars for each day actually engaged in this service, and all legitimate and necessary expenses incurred in attending the meetings of said board. Said expenses shall be paid from the fees and penalties received by the board, under the provisions of this act, and no part of the salary or other expenses of the board shall be paid out of the State treasury. All moneys received in excess of said per diem allowance and other expenses above provided for, shall be held by the secretary as a special fund for meeting the expenses of said board, he giving such bonds as the board shall from time to time direct. The board shall, in its annual report to the governor and to the Illinois Pharmaceutical Association, render an account of all moneys received and disbursed by them pursuant to this act.

Sec. 12. Any person not being, or having in his employ, a registered pharmacist, within the meaning of this act, who shall, sixty days after this act takes effect, keep a pharmacy, or store for retailing or compounding medicines, or who shall take, use, or exhibit the title of a registered pharmacist, shall, for each and every such offence, be liable to a penalty of fifty dollars. Any registered pharmacist who shall permit the compounding and dispensing of prescriptions, or the vending of drugs, medicines, or poisons in his store or place of business, except under the supervision of a registered pharmacist, or except by a "registered assistant" pharmacist, or any pharmacist or "registered assistant" who, while continuing in business, shall fail or neglect to procure his annual registration, or any person who shall wilfully make any false representation to procure registration for himself or any other person, shall, for every such offence, be liable to a penalty of fifty dollars; *Provided*, That nothing in this act shall apply to nor in any manner interfere with the business of any physician, or prevent him from supplying to his patients such articles as may seem to him proper, nor with the making or vending of patent or proprietary medicines, or medicines placed in sealed packages, with the name of the contents and of the pharmacist or physician by whom prepared or compounded, nor with the sale of the usual domestic remedies by retail dealers, nor with the exclusively wholesale business of any dealers except as hereinafter provided; *And provided, further*, That no part of this section shall be so construed as to give the right to any physician to furnish any intoxicating liquor as a beverage, on prescription or otherwise.

Sec. 13. No person shall add to or remove from any drug, medicine, chemical or pharmaceutical preparation, any ingredient or material for the purpose of adulteration or substitution, or which shall deteriorate the quality, commercial value, or medicinal effect, or which shall alter the nature or composition of such drug, medicine, chemical or pharmaceutical preparation, so that it will not correspond to the recognized tests of identity or purity. Any person who shall thus wilfully adulterate or alter, or cause to be adulterated or altered, or shall sell or offer for sale any such adulterated or altered drug, medicine, chemical or pharmaceutical preparation, or any person who shall substitute, or cause to be substituted, one material for another, with the intention to defraud or deceive the purchaser, shall be guilty of a misdemeanor, and be liable to prosecution under this act. If convicted, he shall be liable to all the costs of the action and all expenses incurred by the board of pharmacy in connection therewith, and for the first offence be liable to a fine of not less than fifty dollars nor more than one hundred dollars, and for each subsequent offence a fine of not less than seventy-five nor more than one hundred and fifty dollars. On complaint being entered, the board of pharmacy is hereby empowered to employ an analyst or chemist expert, whose duty it shall be to examine into the so-claimed adulteration, substitution, or alteration, and report upon the result of his investigation; and if said report justify such action, the board shall duly cause the prosecution of the offender, as provided in this law.

Sec 14. No person shall sell at retail any poisons commonly recognized as such, and especially aconite, arsenic, belladonna, biniodide of mercury, carbolic acid, chloral hydrate, chloroform, conium, corrosive sublimate, creosote, croton oil, cyanide of potassium, digitalis, hydrocyanic acid, laudanum, morphine, nux vomica, oil of bitter almonds, opium, oxalic acid, strychnine, sugar of lead, sulphate of zinc, white precipitate, red precipitate, without affixing to the box, bottle, vessel, or package containing the same, and to the wrapper or cover thereof, a label bearing the name of the article, and the word "poison" distinctly shown, with the name and place of business of the seller; who shall not deliver any of said poisons to any person under the age of fifteen years, nor shall he deliver any of said poisons to any person without satisfying himself that such poison is to be used for a legitimate purpose; *Provided*, That nothing herein contained shall apply to the dispensing of physicians' prescriptions of any of the poisons or articles aforesaid. Any person failing to comply with the requirements of this section shall be liable to a penalty of five dollars for each and every such offence.

Sec. 15. All suits for the recovery of the several penalties prescribed in this act, shall be prosecuted in the name of the "people of the State of Illinois," in any court having jurisdiction; and it shall be the duty of the State's attorney of the county where such offence is committed, to prosecute all persons violating the provisions of this act, upon proper complaint being made. All penalties collected under the provisions of this act shall inure, one-half to the board of pharmacy, and the remainder to the school fund of the county in which the suit was prosecuted and judgment obtained.

Approved, May 30th, 1881.

MISSOURI PHARMACY LAW.

An Act *to Regulate the Sale of Medicines and Poisons in the State of Missouri.*

Section 1. *Be it enacted by the General Assembly of the State of Missouri:* That, from and after the passage of this act, it shall be unlawful for any person, not a registered pharmacist within the meaning of this act, to conduct any pharmacy, drug store, apothecary shop, or store for the purpose of retailing, compounding, or dispensing medicines or poisons for medical use, except as hereinafter provided.

Sec. 2. That it shall be unlawful for the proprietor of any store or pharmacy to allow any person, except a registered pharmacist, to compound or dispense the prescriptions of physicians, or to retail or dispense poisons for medical use, except as an aid to and under the supervision of a registered pharmacist. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and on conviction shall be liable to a fine of not less than twenty-five nor more than one hundred dollars for each and every such offence.

Sec. 3. The Governor, with the advice of the Senate, shall appoint three persons from among the most competent pharmacists of the State, all of whom shall have been residents of the State for five years, and of at least five years' practical experience in their profession, who shall be known and styled "Board of Pharmacy for the State of Missouri," one of whom shall hold his office for one year, one for two years, and one for three years, and each until his successor shall be appointed and qualified; and each year thereafter another commissioner shall be so appointed for three years, and until a successor be appointed and qualified. If a vacancy occur in said board, another shall be appointed as aforesaid to fill the unexpired term thereof. Said board shall have power to make by-laws and all necessary regulations, and create auxiliary boards, if necessary, for the proper fulfilment of their duties under this act, without expense to the State.

Sec. 4. The Board of Pharmacy shall register in a suitable book, a duplicate of which shall be kept in the secretary of the State's office, the names and places of residence of all persons to whom they issue certificates, and dates thereof. It shall be the duty of said Board of Pharmacy to register, without examination, as registered pharmacists, all pharmacists and druggists who are engaged in business in the State of Missouri at the passage of this act, as owners or principals of stores or pharmacies for selling at retail, compounding, or dispensing drugs, medicines, or chemicals for medicinal use, or for compounding and dispensing physicians' prescriptions, and all assistant pharmacists eighteen years of age engaged in said stores or pharmacies in the State of Missouri at the passage of this act, and who have been engaged as such in some store or pharmacy where physicians' prescriptions were compounded and dispensed. *Provided, however,* That in case of failure or neglect on the part of any person or persons to apply for registration within sixty days after they shall have been notified, they shall undergo an examination such as is provided for in section 5 of this act.

Sec. 5. That the said Board of Pharmacy shall, upon application, and at such time and place and in such manner as they may determine, examine, either by a schedule of questions to be answered and subscribed to under oath, or orally, each and every person who shall desire to conduct the business of selling at retail, compounding, or dispensing drugs, medicines, or chemicals for medicinal use, or compounding or dispensing physicians' prescriptions as pharmacists; and if a majority of said Board shall be satisfied that said person is competent and fully qualified to conduct said business of compounding or dispensing drugs, medicines, or chemicals for medicinal use, or to compound and dispense physicians' prescriptions, they shall enter the name of such person as a registered pharmacist in the book provided for in section 4 of this act; and that all graduates in pharmacy, having a diploma from an incorporated college or school of pharmacy that requires a practical experience in pharmacy of not less than four years before granting a diploma, shall be entitled to have their names registered as pharmacists by said Board without examination. *Provided, however*, That this act shall not be so construed as to prevent any physician who is authorized to practice medicine or surgery under the laws of this State from registering as a pharmacist or druggist without examination. *Provided*, Any person or persons, not a pharmacist or druggist, may own and conduct such store if he or they keep constantly in their employ a competent pharmacist or druggist.

Sec. 6. The Board of Pharmacy shall be entitled to demand and receive from each person whom they register and furnish a certificate as a registered pharmacist without examination, the sum of two dollars; and for each and every person whom they examine orally, or whose answers to a schedule of questions are returned, subscribed to under oath, the sum of five dollars, which shall be in full for all services; and in case the examination of said person shall prove defective and unsatisfactory, and his name not be registered, he shall be permitted to present himself for re-examination within any period not exceeding twelve months thereafter, and no charge shall be made for such re-examination.

Sec. 7. Every registered pharmacist, apothecary, and owner of drug store shall be held responsible for the quality of all drugs, chemicals, and medicines he may sell or dispense, with the exception of those sold in original packages of the manufacturer, and also those known as "patent medicines;" and should he knowingly, intentionally, and fraudulently adulterate or cause to be adulterated such drugs, chemicals, or medical preparations, he shall be deemed guilty of a misdemeanor, and upon conviction thereof be liable to a penalty not exceeding one hundred dollars, and, in addition thereto, his name be stricken from the register.

Sec. 8. Apothecaries registered as herein provided shall have the right to keep and sell, under such restrictions as herein provided, all medicines and poisons authorized by the National American or United States Dispensatory and Pharmacopœia as of recognized medical utility. *Provided*, That nothing herein contained shall be construed so as to shield an apothecary or pharmacist who violates or in anywise abuses this trust for the legitimate and actual necessities of medicine from the utmost rigor of the law relating to the sale of intoxicating liquors; and, in addition thereto, his name shall be stricken from the register.

Sec. 9. It shall be unlawful for any person, from and after the passage of this act, to retail any poisons enumerated in schedules "A" and "B," except as follows:

Schedule A.

Arsenic and its preparations, corrosive sublimate, white precipitate, red precipitate, biniodide of mercury, cyanide potassium, hydrocyanic acid, strychnia, and all other poisonous vegetable alkaloids and their salts, and the essential oil of bitter almonds.

Schedule B.

Opium and its preparations, except paregoric and other preparations of opium containing less than two grains to the ounce; aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, creosote, veratrum, digitalis, and their pharmaceutical preparations; croton oil, chloroform, chloral hydrate, sulphate of zinc, mineral acids, carbolic acid, oxalic acid,—without labelling the box, vessel, or paper in which the said poison is contained, and also the outside wrapper or cover, with the name of the article, the word "poison," and the name and place of business of the seller. Nor shall it be lawful for any person to sell or deliver any poisons enumerated in schedules A and B unless, upon due inquiry, it be found that the purchaser is aware of its poisonous character and represents that it is to be used for a legitimate purpose. Nor shall it be lawful for any registered pharmacist to sell any poisons included in schedule A without, before delivering the same to the purchaser, causing an entry to be made in a book kept for that purpose, stating the date of sale, the name and address of purchaser, the name of the poison sold, the purpose for which it is represented by the purchaser to be required, and the name of the dispenser, such book to be always open for inspection by the proper authorities, and to be preserved for at least five years. The provisions of this section shall not apply to the dispensing of poison in not unusual quantities or doses upon the prescriptions of practitioners of medicine. Nor shall it be lawful for any licensed or registered druggist or pharmacist to retail, sell, or give away any alcoholic liquors or compounds as a beverage; and any violation of the provisions of this section shall make the principal of said store or pharmacy liable to a fine of not less than twenty-five dollars and not more than one hundred dollars, to be collected in the usual manner.

Sec. 10. Any itinerant vendor of any drug, nostrum, ointment, or appliance of any kind, intended for the treatment of any disease or injury, who shall, by writing, or printing, or any other method, publicly profess to cure or treat disease, or injury, or deformity by any drug, nostrum, or manipulation, or other expedient, shall pay a license of one hundred dollars per annum, to be paid in the manner for obtaining peddler's license.

Sec. 11. That any person who shall procure or attempt to procure registration for himself or for another under this act by making, or causing to be made, false representations, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be liable to a penalty of not less than twenty-five dollars nor more than one hundred dollars, and the name of the person so falsely registered shall be stricken from the register. Any person not a registered pharmacist as provided for in this act, who shall conduct a store, pharmacy, or place for retailing, compounding, or dispensing drugs, medicines, or chemicals for medical use, or for compounding or dispensing physicians' prescriptions, or who shall take, use, or exhibit the title of "registered pharmacist," shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be liable to a penalty of not less than one hundred dollars.

Sec. 12. This act shall not apply to physicians putting up their own prescriptions, nor to the sale of proprietary medicines.

Sec. 13. All acts and parts of acts in conflict with this act are hereby repealed.

Approved March 26th, 1881.

THE NORTH CAROLINA "PHARMACY ACT OF 1881."

An Act *to Incorporate the North Carolina Pharmaceutical Association.*

Section 1. *The General Assembly of North Carolina do enact:* That E. M. Nadal, S. J. Hinsdale, William Simpson, E. H. Meadows, T. C. Smith, John S. Pescud, and such other persons as may be associated with them under the provisions of this act, be and the same are hereby made a body corporate under the name and style of the North Carolina Pharmaceutical Association, and by said name shall have the right to sue and be sued, to plead and be impleaded, to purchase and hold real estate and grant the same, to have and to use a common seal, and to do such other things and perform such other acts as appertain to bodies corporate and politic not inconsistent with the constitution and laws of the State.

Sec. 2. The object of said association is to unite the pharmacists and druggists of this State for mutual aid, encouragement, and improvement, to encourage scientific research, develop pharmaceutical talent, to elevate the standard of professional thought, and ultimately restrict the practice of pharmacy to properly qualified druggists and apothecaries.

Sec. 3. It shall be unlawful from and after the passage of this act, except as hereinafter provided, for any person unless a registered pharmaceutist, within the meaning of this act, to open or conduct any pharmacy or store for retailing, dispensing, or compounding medicines or poisons, or for any one not a registered pharmaceutist to prepare physicians' prescriptions, except under the supervision of a registered pharmaceutist, in the State of North Carolina. *Provided*, That nothing herein contained shall prevent the sale of patent or proprietary medicines, quinine, epsom salts, castor oil, essence of peppermint, paregoric, or laudanum in original package, calomel, camphor, or sweet oil.

Sec. 4. Any person, in order to be registered as a member of said association, shall be a graduate of some college in pharmacy, recognized by the North Carolina Pharmaceutical Association, or shall, at the passage of this act, have had three years' practical experience in the preparation of physicians' prescriptions and in compounding and vending medicines and poisons, or shall be a licentiate of pharmacy of the board of pharmacy of North Carolina, or one who is or has been a regular practicing physician, as hereinafter provided.

Sec. 5. Pharmaceutists claiming the right of registration under this act, on account of practical experience, shall, within ninety days after its passage, show to the satisfaction of the board of pharmacy to be created by this act that they have had three (3) years' practical experience in the preparation of physicians' prescriptions and in compounding and vending medicines and poisons. *Provided*, Nothing in this act shall apply to any person or persons in business on their own account upon the passage of this act, nor to those who are, have been, or may hereafter be regular practicing physicians. Licentiates in pharmacy must have had three years' experience in stores where prescriptions of medical practitioners have been prepared, and shall have passed an examination before the board of pharmacy of this State. The board of pharmacy may register without further examination the licentiates of such other boards of pharmacy as they may deem proper.

Sec. 6. This association shall elect ten of its members, from whom the governor selects five, who shall compose the board of pharmacy. The board is empowered to transact all business relating to the legal practice of pharmacy, to examine into and adjudicate upon all cases of abuse, fraud, adulteration, substitution, or malpractice, and to enforce all the provisions of the law, and to render an annual account to the proper State authorities and to the association. Any one examined by the board shall pay a fee of five dollars. In case of failure to pass a satisfactory examination, he shall be granted a second examination without the payment of a further fee. It shall be the duty of the members of the board, after receipt of notification of their appointment, to appear before the clerk of the county in which they individually reside and make and subscribe to an oath properly and faithfully to discharge the duties of their office, and within thirty days thereafter meet and organize by the election of a president and secretary of said board. The secretary shall be elected to serve for the term of five years, and the term of office of the other members shall be determined by lot. Vacancies in the board shall be filled as provided in section 12. The board shall hold meetings at least once annually, or oftener, as the business of the board may require. The secretary shall give each member of the board not less than ten days' notice of each meeting. Three members shall constitute a quorum. It shall be the duty of the board to examine all persons applying for examination in proper form, and to register such as shall establish their rights to registration, in accordance with the provisions of this act.

Sec. 7. It shall be the duty of the secretary of the board of pharmacy to keep a book of registration at some convenient place, of which due notice shall be given, through the public press, in which shall be entered, under the supervision of the board, the names and places of business of all persons coming under the provisions of this act, and a statement, to be signed by the person making the application, of such facts in the case as he may claim to justify his application The fee for registration for proprietors shall not exceed two dollars, and for those in the employ of others shall not exceed one dollar. The secretary shall give receipts for all moneys received by him, which moneys shall be used for the purpose of defraying the expenses of the board of pharmacy, and any surplus shall be for the benefit of said association. The salary of the secretary shall be fixed by the board, and shall be paid out of the fees for examination and registration. Each member of the board of pharmacy shall receive the sum of five dollars for every day engaged in the service of the board. It shall be the duty of the board to investigate all complaints of disregard, non-compliance, or violation of the provisions of this act, and to bring the same to the notice of the proper prosecuting officer whenever there appears to the board reasonable grounds of complaint. The board is hereby empowered to make such rules and regulations as it shall find necessary for carrying into effect the provisions of this law, not inconsistent with the purpose and spirit of the same.

Sec. 8 Every person, from and after the passage of this act, shall be held responsible for the quality of all drugs, chemicals. and medicines he may sell or dispense, with the exception of those sold in the original packages of the manufacturers, and also those known as "patent medicines;". and should he intentionally adulterate, or cause to be adulterated, or expose to sale, knowing the same to be adulterated, such drugs, chemicals, or medical preparations, he shall be deemed guilty of a misdemeanor, and upon conviction thereof be liable to a penalty not exceeding one hundred dollars, and in addition thereto his name shall be stricken from the register. Every registered pharmacist who desires to continue the practice of his profession, shall annually thereafter, within thirty days next preceding the annual meeting of the board of pharmacy, pay to the secretary of the said board a registration fee of fifty cents, for which he shall receive a renewal of said certificate of registration. Any registered pharmacist failing to renew his registration as required by this section, and continuing in the exercise of his profession, shall be guilty of a misdemeanor.

Sec. 9. It shall be unlawful for any person, under a penalty of twenty-five dollars for each and every offence, from and after the passage of this act, except as provided herein, to retail any poison enumerated in schedules A and B, as follows, to wit:

Schedule A.

Arsenic and its preparations, corrosive sublimate, white precipitate, red precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnine, and essential oil of bitter almonds.

Schedule B.

Aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, creosote, digitalis and their pharmaceutical preparations, croton oil, chloroform, chloral hydrate, sulphate of zinc, carbolic acid, opium and its preparations, except paregoric and other preparations of opium containing less than two grains to the ounce, and other deadly poisons, without distinctly labelling the bottle, box, vessel, or paper in which said poison is contained, with the name of the article, the word "poison," and a vignette representing a skull and bones, and the name and place of business of the seller; nor shall it be lawful for any person to sell or deliver any poison enumerated in said schedules A and B unless upon due inquiry it be found that the purchaser is aware of its poisonous nature, and represents that it is to be used for a legitimate purpose; nor shall it be lawful for any person to sell any poison included in schedule A without, before delivering the same to the purchaser, causing an entry to be made in a book kept for that purpose, stating the date of the sale, the name and address of the purchaser, the name and quantity of the poison sold, the purpose for which it is represented by the purchaser to be required, and the name of the dispenser, such book to be always open to proper authorities for inspection. The provisions of this section shall not apply to the dispensing of poisons in usual doses and by physicians' prescriptions.

Sec. 10. Nothing contained in the foregoing section shall apply to or interfere with the business of any practitioner of medicine who does not keep open shop for the retailing of medicines and poisons, nor with the business of wholesale dealers, excepting section 9 and the penalties for its violation.

Sec. 11. Any person who shall permit, by wilful neglect, the compounding and dispensing of prescriptions in his store or place of business by any person or persons not registered, except under the supervision of a registered pharmaceutist; or any person, not registered, who shall keep open shop for the retailing or dispensing of medicines or poisons, or who shall fraudulently represent himself to be registered; or any registered pharmacist, or any dealer in medicines, who shall fail to comply with the regulations and provisions of this act, in relation to retailing and dispensing of poisons, shall, for every such offence, be deemed guilty of a misdemeanor, and, upon conviction thereof, be liable to a penalty not exceeding twenty-five dollars.

Sec 12. Immediately on passage of this act the governor shall appoint five reputable and practicing pharmacists, doing business within the State, from ten of said pharmacists recommended to him by the North Carolina Pharmaceutical Association; said pharmacists, so appointed, shall constitute the board of pharmacy of the State of North Carolina, and shall hold office for the term of one, two, three, four, or five years respectively, as herein provided, and until their successors have been duly appointed and qualified. The North Carolina Pharmaceutical Association shall annually thereafter recommend five pharmacists, from which number the governor shall fill the vacancy annually occurring in said board. In case of death, resignation, or removal from the State of any member of said board, the governor shall appoint in his place a pharmacist, from the names last submitted to him, to serve as a member of the board for the remainder of the term.

Sec. 13. The penalties prescribed by this act shall be recovered by suits in the name of the people of this State, according to the statute in such cases provided, to be prosecuted by the proper officers of the counties respectively where the violations of the provisions of this act may be committed.

Sec. 14. Any pharmacist failing to comply with the requirements of sections 5 and 8, within ninety days from and after the passage of this act, shall forfeit his right to registration, and shall appear before the board of pharmacy for examination, as provided in section 5 of this act.

SEC. 15. All acts or portions of acts conflicting with the provisions of this act are hereby repealed.

SEC. 16. This bill shall only apply to towns and cities of over five hundred inhabitants.

SEC. 17. This act may for all purposes be quoted under the title of the "Pharmacy Act of 1881."

SEC. 18. This act shall be in force from and after the 1st day of June next.

RATIFIED this the 12th of March, A.D. 1881.

I certify the above to be a true copy from the records on file in this office.

W. L. SAUNDERS,
Secretary of State.

PHARMACY LAW OF WEST VIRGINIA.

AN ACT *to Regulate the Practice of Pharmacy and the Sale of Medicines and Poisons.*

SECTION 1. *Be it enacted by the Legislature of West Virginia:* It shall be unlawful for any person, not a registered pharmacist, or who does not employ exclusively as his salesman a regular pharmacist, within the meaning of this act, to conduct any pharmacy, drug store, apothecary shop or store, for the purpose of retailing, compounding, or dispensing medicines or poisons for medical use, except as hereinafter provided.

SEC. 2. That it shall be unlawful for the proprietor of any store or pharmacy to allow any person, except a registered pharmacist, to compound or dispense the prescriptions of physicians, or to retail or dispense the poisons named in schedules A and B herein for medical use, except as an aid to, and under the supervision of a registered pharmacist. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be liable to a fine of not less than twenty-five, nor more than one hundred dollars, for each and every such offence.

SEC. 3. The Board of Public Works shall appoint one person from each congressional district, from among the most competent pharmacists of the State, all of whom shall have been residents of the State for five years, and of at least five years' practical experience in their profession, who shall be known as commissioners of pharmacy for the State of West Virginia; one of whom shall hold his office for one year, one for two years, and the other for three years, and each until his successor shall be appointed and qualified; and each year thereafter another commissioner shall be so appointed for three years, and until a successor be appointed and qualified. If a vacancy occur in said commission, another shall be appointed, as aforesaid, to fill the unexpired term thereof. Said commissioners, a majority of whom may act, shall have power to make by-laws and all necessary regulations for the proper fulfilment of their duties under this act, without expense to the State, and to examine applicants and grant certificates.

SEC. 4. The commissioners of pharmacy shall register, in a suitable book, a duplicate of which is to be kept in the office of the secretary of state, the names and place of residence of all persons to whom they issue certificates, and the dates thereof. It shall be the duty of said commissioners of pharmacy to register, without examination, as registered pharmacists, all pharmacists and druggists who are engaged in business in the State of West Virginia, at the passage of this act, as owners or principals of stores or pharmacies, for selling at retail, compounding or dispensing drugs, medicines or chemicals for medicinal use, or for compounding and dispensing physicians' prescriptions; and all assistant pharmacists, not under eighteen years of age, engaged in said stores or pharmacies in the State of West Virginia at the passage of this act, and who have been engaged as such in some store or pharmacy where physicians' prescriptions were compounded and dispensed, for not less than five years prior to the passage of this act; *Provided, however*, That in case of failure or neglect on the part of such person or persons to apply for registration within sixty days after they shall have been notified, they shall undergo an examination such as is provided for in section 5 of this act.

Sec. 5. That the said commissioners of pharmacy shall, upon application, and at such time and place, and in such manner as they may determine, examine, orally or otherwise, under such regulations as they may by by-law prescribe, each and every person who shall desire to conduct the business of selling at retail, compounding, or dispensing drugs, medicines or chemicals for medicinal use, or compounding or dispensing physicians' prescriptions as pharmacists; and if a majority of said commissioners shall be satisfied that said person is competent and fully qualified to conduct said business of compounding or dispensing drugs, medicines, or chemicals for medicinal use, or to compound and dispense physicians' prescriptions, they shall enter the name of such person as a registered pharmacist in the book provided for in section 4 of this act; and that all graduates in pharmacy, having a diploma from an incorporated college or school of pharmacy that requires a practical experience in pharmacy of not less than four years before granting a diploma, shall be entitled to have their names registered as pharmacists by said commissioners of pharmacy without examination.

Sec. 6. That the commissioners of pharmacy shall be entitled to demand and receive from each person whom they register and furnish a certificate as a registered pharmacist, without examination, the sum of two dollars; and from each and every person whom they examine, orally or otherwise, the sum of five dollars, which shall be in full for all services. And in case the examination of said person shall prove defective and unsatisfactory, and his name not be registered, he shall be permitted to present himself for re-examination within any period not exceeding twelve months next thereafter, and no charge shall be made for such re-examination.

Sec. 7. Every registered pharmacist shall be held responsible for the quality of all drugs, chemicals, and medicines he may sell or dispense, with the exception of those sold in the original packages of the manufacturer, and also those known as "patent medicines;" and should he knowingly, intentionally, and fraudulently adulterate, or cause to be adulterated, such drugs, chemicals, or medical preparations, he shall be deemed guilty of a misdemeanor, and upon conviction thereof, be liable to a penalty not exceeding one hundred dollars, and in addition thereto his name shall be stricken from the register.

Sec. 8. Apothecaries registered as herein provided shall have the right to keep and sell, under such restrictions as herein provided, all medicines and poisons, authorized by the National American or United States Dispensatory and Pharmacopœia as of recognized utility; *Provided*, That nothing herein contained shall be construed so as to shield an apothecary or pharmacist who violates or in any wise abuses this trust for the legitimate and actual necessities of medicine, from the utmost rigor of the law relating to the sale of intoxicating liquors, and in addition thereto his name shall be stricken from the register.

Sec. 9. It shall be unlawful for any druggist or registered pharmacist, from and after the passage of this act, to retail any poisons enumerated in schedules "A" and "B," except as hereinafter provided, to wit:

Schedule A.

Arsenic and its preparations, corrosive sublimate, white precipitate, red precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnia, and all other poisonous vegetable alkaloids and their salts, essential oil of bitter almonds, opium and its preparations, alcohol and all intoxicating liquors, except paregoric and other preparations of opium containing less than two grains to the ounce.

Schedule B.

Aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, creasote, digitalis, and their pharmaceutical preparations; croton oil, chloroform, chloral hydrate, sulphate of zinc, mineral acids, carbolic acid, and oxalic acid, without distinctly labelling the box, vessel or paper, the box, vessel, or paper to be colored black, bearing the death's head and cross bones, in which the said poison is contained, and also the outside wrapper, or cover, with the name of the article, the word "poison," and the name and place of business of the seller. All drugs, poisons, and preparations sold by any druggist shall be labelled with the name of the article in English, or with the common name of said article. Nor shall it be lawful for any druggist or registered pharmacist to sell or deliver any poison enumerated in schedules "A" and "B," unless upon due inquiry it be found that the purchaser is aware of its poisonous character, and represents that it is to be used for a legitimate purpose. Nor shall it be lawful for any registered pharmacist to sell any poisons included in Schedule "A" without, before delivering the same to the purchaser, causing an entry to be made in a book kept for that purpose, stating the date of sale, the name and address of the purchaser, the name of the poison sold, the purpose for which it is represented by the purchaser to be required, and the name of the dispenser, such book to be always open for inspection by the proper authorities, and to be preserved for at least five years. The provisions of this section shall not apply to the dispensing of poisons in not unusual quantities or doses upon the prescriptions of practitioners of medicine. Nor shall it be lawful for any licensed or registered druggist or pharmacist to retail or sell any alcoholic liquors or compounds as a beverage; and any violations of the provisions of this section shall make the owner or principal of said store or pharmacy liable to a fine of not less than twenty-five dollars and not more than one hundred dollars, and, in addition thereto, for repeated violations of this section, his name shall be stricken from the register.

Sec. 10. Any person who shall procure, or attempt to procure, registration for himself, or for another, under this act, by making, or causing to be made, any false representations, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be liable to a penalty of not less than twenty-five nor more than one hundred dollars, and the name of the person so fraudulently registered shall be stricken from the register. Any person not a registered pharmacist, as provided for in this act, who shall conduct a store, pharmacy, or place for retailing, compounding or dispensing drugs, medicines, or chemicals, for medicinal use, or for compounding or dispensing physicians' prescriptions, or who shall take, use, or exhibit the title of a registered pharmacist, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be liable to a penalty of not less than fifty dollars.

Sec. 11. This act shall not apply to physicians putting up their own prescriptions, nor to the sale of patent or proprietary medicines, and other ordinary drugs and dye-stuffs as are usually sold in a country store.

Sec. 12. It shall be the duty of the board to investigate all complaints and charges of non-compliance or violation of the provisions of this act, and to bring the same to the notice of the proper prosecuting officer, as provided for in Section 7 of this act whenever there appears to the board reasonable grounds for such action.

Sec. 13. Whenever any person is prosecuted and fines are collected, one half of the fines shall be paid to the Board of Pharmacy for the State Pharmaceutical Association, the remainder shall be paid to the State school fund; but in case no State pharmaceutical association is formed or organized the full amount of fines shall go to the State school fund.

Sec. 14. All acts and parts of acts inconsistent with this act are hereby repealed.

Passed February 21st, 1881.

FOOD AND DRUG ADULTERATION LAW OF NEW YORK AND NEW JERSEY.

Section 1. No person shall, within this State, manufacture, have, offer for sale, or sell any article of food or drug which is adulterated within the meaning of this act, and any person violating this provision shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be punished by a fine not exceeding fifty dollars for the first offence, and not exceeding one hundred dollars for each subsequent offence (for a second and subsequent offences, *N. J.*).

Sec. 2. The term "food," as used in this act, shall include every article used for food or drink by man. The term "drug," as used in this act, shall include all medicines for internal or external use.

Sec. 3. An article shall be deemed to be adulterated within the meaning of this act:

a. In the case of drugs.

1. If, when sold under or by a name recognized in the United States Pharmacopœia, it differs from the standard of strength, quality, or purity laid down therein.

2. If, when sold under or by a name not recognized in the United States Pharmacopœia, but which is found in some other pharmacopœia or other standard work on Materia Medica, it differs materially from the standard of strength, quality, or purity laid down in such work.

3. If its strength or purity fall below the professed standard under which it is sold.

b. In the case of food or drink.

1. If any substance or substances has or have been mixed with it so as to reduce or lower or injuriously affect its quality or strength.

2. If any inferior or cheaper substance or substances have been substituted wholly or in part for the article.

3. If any valuable constituent of the article has been wholly or in part abstracted.

4. If it be an imitation of, or be sold under the name of another article.

5. If it consists wholly or in part of a deceased or decomposed, or putrid or rotten, animal or vegetable substance, whether manufactured or not, or in the case of milk, if it is the produce of a diseased animal.

6. If it be colored, or coated, or polished, or powdered, whereby damage is concealed, or it is made to appear better than it really is, or of greater value.

7. If it contain any added poisonous ingredient, or any ingredient which may render such article injurious to the health of a person consuming it; *Provided*, That

the State board of health may, with the approval of the governor, from time to time declare certain articles or preparations to be exempt from the provisions of this act; *And provided, further*, That the provisions of this act shall not apply to mixtures or compounds recognized as ordinary articles of food, provided that the same are not injurious to health, and that the articles are distinctly labelled as a mixture, stating the components of the mixture.

SEC. 4. It shall be the duty of the State board of health to prepare and publish from time to time, lists of the articles, mixtures, or compounds declared to be exempt from the provisions of this act in accordance with the preceding section. The State board of health shall also from time to time fix the limits of variability permissible in any article of food, or drug, or compound, the standard of which is not established by any national pharmacopœia.

SEC 5 The State board of health shall take cognizance of the interests of the public health as it relates to the sale of food and drugs and the adulteration of the same, and make all necessary investigations and inquiries relating thereto. It shall also have the supervision of the appointment of public analyst and chemist, and upon its recommendation, whenever it shall deem any such officers incompetent, the appointment of any and every such officer shall be revoked and be held to be void and of no effect. Within thirty days after the passage of this act, the State board of health shall meet and adopt such measures as may seem necessary to facilitate the enforcement of this act, and prepare rules and regulations with regard to the proper methods of collecting and examining articles of food or drugs, and for the appointment of the necessary inspectors and analysts; and the State board of health shall be authorized to expend, in addition to all sums already appropriated for said board, an amount not exceeding ten thousand dollars (five hundred dollars, *N. J.*), for the purpose of carrying out the provisions of this act [and the sum of ten thousand dollars is hereby appropriated out of any money in the treasury not otherwise appropriated, for the purposes in this section provided].

SEC. 6. Every person selling or offering or exposing any article of food or drugs for sale, or delivering any article to purchasers, shall be bound to serve or supply any public analyst or other agent of the State or local board of health (any inspector, *N. J.*) appointed under this act, who shall apply to him for that purpose, and on his tendering the value of the same, with a sample sufficient for the purpose of analysis of any article which is included in this act, and which is in the possession of the person selling, under a penalty not exceeding fifty dollars for a first offence, and one hundred dollars for a second and subsequent offences.

SEC. 7. Any violation of the provisions of this act shall be treated and punished as a misdemeanor; and whoever shall impede, obstruct, hinder, or otherwise prevent any analyst, inspector, or prosecuting officer in the performance of his duty, shall be guilty of a misdemeanor, and shall be liable to indictment and punishment therefor.

SEC. 8. Any act or parts of acts inconsistent with the provisions of this act are hereby repealed.

[SEC. 9. All the regulations and declarations of the State board of health made under this act, from time to time, and promulgated, shall be printed in the statutes at large]

SEC. 10. This act shall take effect at the expiration of ninety days after it shall become a law. (Section 9. This act shall be deemed a public act, and shall take effect at the expiration of thirty days after it shall become a law, *N. J.*)

FOOD AND DRUG ADULTERATION LAW OF MICHIGAN.

An Act *to Prevent and Punish the Adulteration of Articles of Food, Drink, and Medicine, and the sale thereof when Adulterated.*

Section 1. *The people of the State of Michigan enact*, That no person shall mix, color, stain, or powder, or permit any other person to mix, color, stain, or powder any article of food with any ingredient or material so as to render the article injurious to health, with the intent that the same may be sold; and no person shall knowingly sell or offer for sale any such article so mixed, colored, stained, or powdered.

Sec. 2. No person shall, except for the purpcse of compounding in the necessary preparation of medicine, mix, color, stain, or powder, or order or permit any other person to mix, color, stain, or powder any drug or medicine with any ingredient or materials so as to affect injuriously the quality or potency of such drug or medicine, with intent to sell the same, or shall sell or offer for sale any such drug or medicine so mixed, colored, stained, or powdered.

Sec. 3. No person shall mix, color, stain, or powder any article of food, drink or medicine, with any other ingredient or material, whether injurious to health or not, for the purpose of gain or profit, or sell or offer the same for sale, or order or permit any other person to sell or offer for sale any article so mixed, colored, stained, and powdered, unless the same be so manufactured, used, or sold, or offered for sale under its true and appropriate name, and notice that the same is mixed or impure is marked, printed, or stamped upon each package, roll, parcel, or vessel containing the same, so as to be and remain at all times readily visible, or unless the person purchasing the same is fully informed by the seller of the true name and ingredients (if other than such as are known by the common name thereof) of such article of food, drink, or medicine at the time of making sale thereof or offering to sell the same.

Sec. 4. No person shall mix any glucose or grape-sugar with syrup, honey, or sugar intended for human food, or any oleomargarine, suine, beef fat, lard, or any other foreign substance, with any butter or cheese intended for human food, or shall mix or mingle any glucose or grape-sugar or oleomargarine with any article of food, without distinctly marking, stamping, or labelling the article, or the package containing the same, with the true and appropriate name of such article, and the percentage in which glucose or grape-sugar, oleomargarine, or suine, enter into its composition; nor shall any person sell or offer for sale, or order or permit to be sold, or offered for sale, any such food into the composition of which glucose, or grape-sugar, or oleomargarine, or suine has entered, without at the same time informing the buyer of the fact, and the proportions in which such glucose or grape-sugar, oleomargarine, or suine has entered into its composition.

Sec. 5. Any person convicted of violating any provision of any of the foregoing sections of this act shall be fined not more than fifty dollars, or imprisoned in the county jail not exceeding three months.

Sec. 6. It is hereby made the duty of the prosecuting attorneys of this State to appear for the people and to attend to the prosecution of all complaints under this act in all the courts in their respective counties.

Sec. 7. All acts and parts of acts inconsistent with the provisions of this act are hereby repealed.

Approved, June 10th, 1881.

REPORT OF THE COMMITTEE ON EXHIBITION.

Your committee have the honor to report the exhibit under the auspices of our Association, consisting of drugs, chemicals, pharmaceutical products, druggists' sundries, and miscellaneous articles, held in the hall of the Kansas City Board of Trade, the size of the spacious hall being seventy-two feet wide by one hundred and twenty feet long. In a conspicuous place in the hall were displayed these words, "Kansas City welcomes the American Pharmaceutical Association." Great credit is due exhibitors in charge of various stands for good taste shown in making the general exhibit attractive.

The local secretary, Mr. William T. Ford, deserves special mention for faithful work, in the general arrangement of the exhibition, by rendering all the assistance in his power to exhibitors and members of our Association, while in the *Gate City* of the great West.

CRUDE DRUGS.

McKesson & Robbins, of New York, made a large and interesting exhibit of drugs, in East Indian and South American cinchona barks in ceroons (hides) and cases, each lot marked with its analysis, ranging from ½ of 1 per cent. to 3½ per cent. of quinine; also soft Colombian barks, and twenty-eight samples of cultivated Java barks; two bales of cuprea (coppery) bark,—a hard and heavy bark,—one containing 1½ per cent. quinine, the other 2¼ per cent. of quinine, and stated to contain no cinchonidia. This bark was accidentally discovered on the mountain ranges of Buccarramanga, State of Santander, United States of Colombia. It is stated that since the introduction of this bark the price of quinine has generally been lower.

In another wing of their exhibit were shown drugs in sample boxes: as Chinese and Russian cantharides, Kousso flowers in bundles, oil eulachon or candle-fish oil, claimed to possess the qualities of cod-liver oil, its source the Northwest Coast of America; these with forty-five other well-selected specimens of rare and staple drugs being a creditable display. They also exhibited an herbarium, quite instructive, containing over three hundred specimens of medicinal plants of the *German Pharmacopœia.*

Thorp & Lloyd Brothers, of Cincinnati, exhibited a large collection of carefully selected medicinal plants from California and other parts of the Western Continent, as well as foreign plants. This display for completeness, as a rare collection, was of great interest to the student of pharmacy, and attracted much attention; among the lot we note alstonia constricta bark, the Australian fever tree, true damiana, eucalyptus globulus, frankenia grandifolia, rhamnus purshiana, eriodictyon glutinosum, etc.

R. J. Brown Manufacturing Co., of Leavenworth, Kansas, made an instructive and well-arranged display in a large collection of medicinal plants of the Kansas flora, their fresh and natural appearance in unbroken forms made them appear attractive and interesting.

Allaire, Woodward & Co., of Peoria, Ill., exhibited pressed herbs and powdered drugs. On the labels of their powdered opium and cinchona barks they have printed the alkaloidal strength in quantity that the various drugs possess, also the medical properties and formulas for use,—a commendable feature. They had a large cube of glucose sugar, and gave a taste to any one wanting to test its degree of sweetness.

The Leis Manufacturing Company, of Lawrence, Kansas, had a choice collection of Mexican vanilla beans, and two packages of dandelion root, one lot gathered during the inflorescence of the plants, and the other during semination.

Parke, Davis & Co., of Detroit, Mich., made a neat display of drugs, some of which have acquired pharmaceutical and medical notice within the past ten years. Their selections were choice and of interest. We designate a few: Damiana, rhamnus purshiana, yerba santa, lippia mexicana, cascara amarga, hoang nan, manaca, berberis aquifolium, also pure leaf-pressed herbs, roots, and barks freed from extraneous matter.

Huber & Co., of Fond du Lac, Wis., exhibited pressed herbs neatly packed; each ounce package had printed on the wrapper the medicinal property of the herb, and the manner of preparing for domestic use, with the dose. They also had ground and powdered herbs, barks, and roots, all having the appearance of purity.

CHEMICAL AND PHARMACEUTICAL PRODUCTS.

Powers & Weightman, of Philadelphia, made a large, massive, and expensive display of their chemicals, which were shown in neat-looking glassware, and every article exhibited was as handsome and perfect as could be made through chemical art. We note a few of the chemicals: A full line of alkaloids and salts of the cinchona barks and opium, bromide and iodide of potassium, tartaric and citric acid, the various bismuth preparations, mercury salts, strychnia salts, picrate ammonium, sulphate cadmium, nitrate cerium, salicylate cinchonidia, bromide quiniæ, thebolactate of calcium, bisulphate quinidia, iod. hydrarg. potass., soluble cream tartar in crystals, bromide of ethyl, sesquioxide uranium, metallic arsenic, bromide strychnia, nitrate barium, with many other staple chemicals.

Charles T. White & Co., of New York, had a large and elegant display of fine chemicals. A prominent feature of their exhibit consisted in the regularity and beauty of the crystals in cubes, planes, and angles of their chemical salts. We note a few of the fine and rare chemicals: their citrate of iron and mixed alkaloids from barks, termed quinquinia, were handsome, so were also the muriate and sulphate quinquinia, crystals of biniodide mercury, bromide and iodide potassium, muriate cinchonidia, valerianate quinia, bromide strychnia, oxychloride of bismuth, subnitrate bismuth in drops, stated to be free from arsenic, a line alkaloidal salts of cinchona barks and opium, strychnia salts in the sulphate, nitrate, muriate, and acetate, all in perfect crystals.

G. Mallinckrodt & Co., of St. Louis, the large chemical manufacturers of the West. had on exhibition a fine line of chemicals used in medicine and in the arts. Among this prominent display we found on a neatly arranged stand a fine line of carbolic acid, chloroform, iodide and bromide potassium, bismuth preparations, mercurials, crysophanic acid, nitrate ammonium fused, sulphocyanide potassium, sulphite magnesium, citrate of iron and ammonium, picrate ammonium, piperine, chloral hydrate crystals, monobromated camphor, with numerous other products from their laboratory, making in all a handsome display.

Thorp & Lloyd Brothers, of Cincinnati, exhibited of interest their manufacture of white alkaloid of hydrastis, a two-gallon jar, the entire product of five thousand pounds of hydrastis; also a ten-gallon jar of pure dark-colored podophyllin. In order to procure about forty pounds of this resin it takes about one thousand pounds of May apple root. Mr. Lloyd in his paper states the yield to average 4 per cent. In addition to the foregoing, this firm exhibited a number of two-gallon jars, containing ferrocyanide of iron, carbazotate ammonium, salicylate of berberin, sulphate, muriate, citrate, tartrate, and other salts of berberin; these latter preparations are very seldom seen by pharmacists, excepting in ounce vials, and such large masses were unusually attractive. They also presented a line of 200 specimens of their fluid extracts.

McKesson & Robbins, of New York, exhibited their handsome oval gelatin-coated pills, comprising one hundred and fifty varieties of officinal and unofficinal formulas. The finish of the pills was perfect, presenting a neat appearance in a mahogany case. They made a large display of from 50 to 100 ounces of quinia sulphate and bisulphate, cinchonidia sulphate, chinoidine purified; these were shown in a case resembling an aquarium; sixty specimens alkaloids and their salts, prepared from cinchona barks; a line of fluid extracts, medicinal syrups, wines, and aromatic elixirs.

Eli Lilly & Co., of Indianapolis and Kansas City, exhibited a large line of their handsomely prepared sugar-coated and gelatin-coated pills, which were shown in bulk and in stylish glassware, also fluid extracts and elixirs. An attractive feature of this was the crimson drapery festooned on the wall, surmounted by a sign 30 x 36, with background of over thirty thousand sugar-coated pills.

Parke, Davis & Co., of Detroit, Mich., made an elaborate and varied display in solid and fluid extracts, elixirs, medicated syrups, sugar-coated and gelatin-coated pills, medicated lozenges, extract of malt, combined with various medicinal substances. An interesting part of their exhibit were their elastic gelatin capsules, of sizes holding from 1 to 4 drachms of medicinal agents; they presented a handsome appearance on plate-glass mirrors in open cases.

John Wyeth & Co., of Philadelphia, exhibited pharmaceutical products, their special preparations, as hypodermic tablets, in numerous formulas, also compressed pills, a large variety of fluid extracts, elixirs, medicinal wines and syrups, dialyzed iron, Lawton's absorbent cotton, etc. This display appeared handsome, owing to their style of elegant bottles with preparations arranged on a black walnut stand.

W. H. Schieffelin & Co., of New York, made an exhibit of their soluble coated pills, which were attractive, owing to perfect uniformity of size and beauty of finish; the brilliancy of colors shown was due to the extreme thinness and transparency of the coating used, the exact color of each mass being thus plainly seen.

William R. Warner & Co., of Philadelphia, exhibited in pyramidal form sugar-coated pills and granules, with cachous and elixirs. Their display was unique and appropriately handsome. In coating pills they claim to perform the coating without direct application of heat, leaving pill mass soft and pliable.

Burrough Bros. Manufacturing Co., of Baltimore, exhibited a very large line of fluid extracts, prepared as stated, by their patent circulating hot water bath process (without vacuum), at a temperature from 120° to 160° Fahr.

Seabury & Johnson, of New York, had on exhibition a full line of their medicated, surgical, and adhesive plasters, in quality equal to any modern invention in the manufacture of plasters. Carbolated, borated, and salicylated cottons were in the display.

G. Heineman & Co., of Chicago, exhibited their manufacture of medicated plasters, isinglass and court plasters, corn and bunion plasters, equal to the best English. A new combination, called the salicylated and glycerinated isinglass adhesive plaster, transparent and waterproof, of great strength; a folded sheet was placed in a funnel and filled with water without any passing through during three days, establishing its waterproof qualities.

Mellor & Rittenhouse, of Philadelphia, exhibited their manufacture of extract of licorice of superior quality, licorice lozenges in glass-front boxes, pure powdered extract of licorice, and ammoniacal glycyrrhizin in scales, stated to be sixteen times the sweetening property of licorice root.

Smith, Kline & Co., of Philadelphia, exhibited concentrated liquor ferri iodidii, claimed to be a permanent solution (unchangeable) for preparing syrup ferrous iodide; they recommend one volume of conc. liq. fer. iod. and seven volumes of syrupus; they had also conc. liq. phosph. comp., conc. liq. ferri et quiniæ et strychniæ phosph.

McCormack Bros., of Chicago, exhibited druggists' counter cases of homœopathic remedies in liquids and pellets.

GLASSWARE AND SUNDRIES.

Whitall, Tatum & Co., of Philadelphia, made an attractive display of their druggists' glassware, consisting of prescription bottles, glass-labelled, of neat workmanship and finish; double weight homœopathic vials; many handsome styles of cut and pressed glass cologne bottles; chemical glassware; prescription, desk, and chemical reagent bottles, with labels blown on glass, and a large line of sundries.

DRUGGISTS' SUNDRIES.

Meyer Brothers & Co., of St. Louis, Kansas City, and Fort Wayne, made their display on an elevated platform, with a beautiful line of costly holiday goods, a pyramid of imperial crown extracts in half-pound and ten-pound bottles, elegant odor cases, fancy boxes, vase toilet sets, celluloid and ivory sets, cut-glass Bohemian ware, puff and jewel boxes, plush toilet sets, one toilet set valued wholesale at $300, a selection of fine sponges, and sponges with coral and rock formation attached to them as taken out of the sea. The insurance on this exhibit was stated to have been placed at $10,000.

J. W. Randolph & English, of Richmond, Va., made a very large display of their manufacture of druggists' paper boxes, consisting of a handsome line of paper, pill, and powder boxes, with and without labels. In the large space they occupied an assortment of over 400 boxes was shown. They had a line of perfect ointment boxes, and, to demonstrate the fact was, the boxes held kerosene oil. A new industry for this country was shown in the exhibit of puff boxes, made from paper, satin, and willow, about one hundred varieties. The pyramid of boxes was a novel sight, 23 feet high, ranging from 3 feet to 1 inch square.

Young, Ladd & Coffin, of New York, manufacturers of Lundberg perfumes, made a display of perfumeries, colognes, and odor cases, which were shown in a carved and polished chestnut case with plate glass, divided into three compartments; their Rhenish cologne, the bottles surrounded with wicker, was equal to foreign make. The mammoth atomizer was an attractive feature of the exhibit.

Theodore Ricksecker, of New York, made a large display of perfection tooth brushes, face powder, new perfumes, and stick bandoline of his manufacture, also soaps, hospital lint, surgeon's bandages, etc.

Robinson Bros. & Co., of Boston, exhibited an assortment of fine toilet soaps, comprising honey, glycerin, oatmeal, bath soap, etc., with a number of new styles.

The Leis Manufacturing Co., of Lawrence, Kansas, exhibited perfumes, colognes, and flavoring extracts. Their flowing fountain of choice cologne was a popular feature. Visitors were invited to practically test the odor of the perfume.

G. Heineman & Co., of Chicago, exhibited handsome embroidered chest protectors, shoulder braces, powder puffs, elastic hosiery, and trusses, equal to European manufacture.

The Packer Manufacturing Co., of New York, exhibited vegetable oil and fine bar soaps, glycerin and Florida water soaps; these soaps were handsomely wrapped and packed, labelled in colored prints.

The Transatlantic Supply Company, of Chicago, exhibited French pill and powder paper-boxes, double edge pattern, with neat designs in labels; they also had a perfect wafer-closing apparatus.

MISCELLANEOUS.

Woodward, Thaxton & Co., of Kansas City, exhibited Gillam's acme poison guard, a device consisting in a ball being suspended or hung to a bottle by means of a chain and a rubber band fastened around the neck.

Thomas Daniels, of Toledo, exhibited his pill machine for the manufacture of pills in large quantities. He claims to make at each cutting 5000 of 1 and 2 grain pills, 1450 of 2 to 4 grain pills, 1000 of 5 to 6 grain pills. It consists of an iron base with polished top surface of 12 inches square, another base of 9 inches square, and plates with numerous consecutive cells; a roller cutter of alternate disks of steel and hard rubber; a square cutting frame, with minor smaller parts. The pill mass is rolled to a gauged thickness, according to size or weight of pills wanted, the sheet cut square, then transferred to the plate with cells, and cut with roller into cubes, finally rolled on a pill board by means of a muller.

W. H. Schieffelin & Co., of New York, exhibited Page's vapo-cresoline, recommended as an inhalant for the treatment of whooping-cough, asthma, etc.

C. L. Lochman, of Bethlehem, Pa., exhibited photographs of medicinal plants, instructive illustrations for giving the comparative appearance of plants.

Benjamin Lillard, of New York, had in charge the pharmaceutical journal "New Remedies."

Mark's Adjustable Folding Chair Co., of Chicago, exhibited a physician's and surgeon's operating chair, adjustable to thirty changes of the back and twenty-five of the foot.

Richardson & Co., of St. Louis, had copies of their cost and stock books, a complete work in quoting prices (with blank marginal spaces to enter fluctuations) of drugs, chemicals, pharmaceutical preparations, druggists' sundries, proprietary medicines, liquors, paints, oils, artists' materials, glassware of all descriptions, chemical apparatus, druggists' outfit, and products of all the leading manufacturers dependent on the drug trade. A number of members of the Association became fortunate possessors of this large, valuable, and commendable work.

Bartlett, Putnam & Co., of Chicago, made a display of trusses, elastic stockings, etc.

The Committee on Exhibition, appointed during the first session of the Association, were unable to attend to the duties, owing to sickness of two of its members and the extremely warm weather prevailing at that time, resulting in a failure to secure a quorum for organization, which necessitated the appointment of other members to fill vacancies on the last day of the meeting, giving only a short time for the new committee to perform the duties assigned them in a satisfactory manner, so that omissions to report deserving articles may occur.

Exhibitors on the first day of the opening of exhibition should present to the committee in writing, a brief report of their exhibit of leading articles they wish to call to the attention of the committee; it would result in a more satisfactory report of the exhibit to exhibitors, and materially shorten the labors of the committee, who, in order to attend to all the details of the exhibition, are prevented from attending the meetings of the Association.

JACOB D. WELLS, Ohio,
Chairman,
CHARLES A. WEAVER, Iowa,
T. ROBERTS BAKER, Virginia,
WILLIAM S. THOMPSON, Washington, D. C.
JULIUS H. WILSON, Illinois,
Committee on Exhibition.

SPECIAL REPORTS AND ESSAYS.

I. PHARMACY.

SOLUTIONS OF CHEMICALS FOR CONVENIENCE IN DISPENSING.*

BY GEORGE W. SLOAN, M.D., INDIANAPOLIS, INDIANA.

QUERY No. 1. What solutions of poisonous substances, usually prescribed in small amounts, is it desirable to keep ready prepared in the prescription-case? What strength of each is most convenient? Name the menstruums.

In reply to this query I will say I had hoped to give the subject considerable attention, but through a press of other duties have not been able to do so as thoroughly as I desired.

For many years I have used a series of volumetric solutions for the greater ease and accuracy in the dispensing of the more important of the soluble poisons, such as the salts of atropia, morphia, duboisia, eserina, strychnia, and corrosive sublimate, together with many other articles that should not be enumerated among the poisons.

Of course, my plan has been of such a character that the substances used have been proportioned, to a great extent, to meet an established trade, and their arrangement may be considered more convenient than elegant.

My experience is that solutions of soluble alkaloidal salts, made with *distilled* water, carefully filtered, kept in well-stoppered bottles, in a *dark* closet of an equable temperature, do keep well for reasonably long periods.

I have adopted this plan after having tried various suggestions, such as the addition of glycerin, alcohol, or sulphurous acid, all of which are objectionable, especially for such as may be used for hypodermic injections. I have a solution of duboisina now, made nearly a year, and it is entirely free of flocculi.

There are many articles in frequent use at the dispensing-counter that are of such a deliquescent character that the opening of a package frequently entails the loss of the balance not used on that occasion, or else the labor to dry it again (especially if the day be warm or damp).

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* Read at the Fifth Session.

The most of them may be kept in solution of definite strength, and diluted as required; thus convenience and economy may be combined.

Pharmacists, of course, can elect the various strengths that their experience would demand.

I append a list of the strengths of the important solutions I keep made:

Article.	Solvent.	Amount.
Chloral hydrate,	Water,	ʒi in fʒi.
Corrosive sublimate,	Alcohol,	gr. i in fʒi.
Zinc chloride,	Water,	gr. ij in fʒi.
Atropia sulphate,	Water,	gr. i in fʒi.
Duboisina,	Water,	gr. i in fʒi.
Eserin sulphate,	Water,	gr. i in fʒi.
Strychnia sulphate,	Alcohol, 1 Water, 3	gr. i in fʒij.
Calcium bromide,	Water,	ʒi in fʒi.
Zinc bromide,	Water,	ʒi in fʒi.
Lithium bromide,	Water,	ʒi in fʒi.

To this list may be added solutions of

Potassium acetate,	ʒi in fʒi.
Potassium iodide,	ʒi in fʒij.
Potassium bromide,	ʒi in fʒij.

And many other articles that will form stable preparations; their use will prove economical in the saving of both time and labor.

Of the above list the only item that has given any trouble is the strychnia, which I find is disposed to crystallize if the temperature falls much below 50° F.

Chlorate of potassium in saturated solutions is very convenient to have at hand. I prefer to wash the commercial salt with cold water, drain, and dissolve in boiling water, filter into the bottle, and, as it is used, add water to the remaining crystals until exhausted.

ON THE SUBSTITUTION OF GRAPE-SUGAR OR GLUCOSE FOR CANE-SUGAR IN PHARMACEUTICAL PREPARATIONS.*

BY CHARLES B. ALLAIRE.

QUERY 12. Can grape-sugar or glucose be substituted for cane-sugar, honey, and glycerin in pharmaceutical preparations? Give a practical essay on the subject.

IT becomes necessary at the outset to give up the idea of using glucose or grape-sugar as a perfect substitute for cane-sugar, for the reason that the most casual observer will notice that there is a great deficiency in sweetness.

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* Read at the Fifth Session.

We shall, therefore, give our attention to their comparative values as preservative agents, and to this end I have made samples of all the officinal syrups, using grape-sugar where cane-sugar is indicated, and glucose of 1.317 gravity where simple syrup is indicated. These samples were made early in June of the present year, and have, therefore, been subjected to about two months of very warm weather, besides being kept in a very warm room, and exposed during a portion of each day to the direct rays of the sun.

The glucose and grape-sugar used in making these samples were from the factory of the American Grape-sugar Company, of Buffalo, New York, whose goods compare favorably with the best foreign makes, which are produced from potato-starch.

The glucose contained a trace of lime, so that, when diluted, there was a perceptible amount of sediment in each bottle, but after this sediment had been once filtered out, no more was formed. Samples of the glucose and grape-sugar used are herewith submitted.

The following list comprises those which fermented:

Gum Arabic,
Almonds,
Orange-peel,
Cherry bark,
Orange flowers,
Rhatany by percolation.

The following list comprises those which became more or less mouldy:

Citric acid,
Orange flowers,
Lemon-juice,
Squill compound,
Ginger.

Syrup of orange flowers was the only one affected by both mould and fermentation.

The following list comprises those samples which remained unchanged, and are, at the present writing, in good condition:

Garlic,
Iodide of iron,
Ipecac,
Rhatany from fluid extract,
Rhubarb,
Rhubarb, aromatic,
Red roses,
Blackberry,
Sarsaparilla compound,
Squill,
Senega,
Tolu.

Syrup of the iodide of iron, when placed in bottles filled into the neck, remained unchanged, though the cork was placed loosely in the bottle, while a portion from the same lot, placed in a bottle only half full, and, though corked tightly, gradually became colored.

These samples were all made in accordance with the directions given in the officinal process for each syrup. It will be noticed that those syrups which are made from the fluid extracts, such as rhatany and ipecac, were affected by neither mould nor fermentation, a circumstance due probably to the alcohol contained in the fluid extracts. It is also quite probable that a larger percentage of these syrups would have remained stable if made of a heavier gravity.

In regard to the sedimentary deposit of lime found in all the samples, and which, as I said before, was due to the presence of lime in the glucose used, it may be said that such a result would not usually be obtained, as the best grades of glucose in the market are, as a rule, quite free from any contamination of lime. This deposit may be easily separated by filtration, when present, and might not be considered otherwise objectionable.

In conclusion, therefore, we may state that there is no advantage to be gained in the use of glucose over grape-sugar except a very slight saving in the cost. I have not been able to make a sample which would keep better than if made of the same gravity of cane-sugar, and the very noticeable deficiency in point of sweetness will be found an objection that overbalances all other advantages that can possibly be gained in any other way.

It will be seen, however, that for manufacturing purposes in a large way there is a temptation, in making syrups, to use more or less glucose or grape-sugar.

I desire, in this connection, to call attention to the use of glucose as an excipient in pill-masses. It has the property of remaining soft for a long time, and, as it contains considerable dextrin and gummy matter, a small proportion only is necessary.

SPIRITUS ODORATUS—COLOGNE WATER.*

BY THOMAS J. COVELL, OF MARSHALLTOWN, IOWA.

In view of the absence of a formula for Cologne water in Mr. C. M. Miller's answer to Query 9, at Saratoga, viz.: "Cologne water is often prescribed. Should a formula be made officinal, and, if so, what formula is best adopted?" The writer begs leave to contribute a formula of his own construction, which does produce a most excellent article, and, should it meet the approval of the Association, it is believed that this Cologne water will give entire satisfaction, as it is very fragrant, agreeable, and highly refreshing, and will satisfy the needs of both pharmacists and the public. This formula is a result of much per-

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* Read at the Fifth Session.

sonal experimenting, and is now freely offered, in the hope that it will obtain a trial by the members of the Association.

Take of oil of lavender-flowers,	ʒiv
" rosemary "	ʒij
" neroli bigarade,	ʒx
" petitgrain,	ʒx
" lemon-peel,	ʒx
" orange-peel,	ʒxx
" bergamot,	ʒxx
" rose geranium,	ʒiv
tinct. styrax,	ʒxvi
Cologne spirits,	Oxxvi
orange-flower water,	Ovi

Yield 4 gallons.

Note.—Use avoirdupois weight for the oils. Mix the oils with the alcohol, and allow the mixture to remain for twenty-four hours, then add gradually the orange-flower water.

PRECIPITATES IN FLUID EXTRACTS.*

BY J. U. LLOYD, CINCINNATI, OHIO.

In an article presented to this society at the Indianapolis meeting (1879) I considered the principle of percolation, the influence exerted by height of material, fineness of powder, maceration, temperature, etc., as well as the connection between maceration and percolation. I state in that article, regarding the act of percolation, that "counteracting agencies overcome to a very great extent the theoretical advantages contact should afford. Some of these influences we have been led to consider, others have yet to be mentioned. I presented the subject at that time, in order to follow up the line of argument, as though the various menstrua entered the powders intact, and in their passage through the powders dissolved certain materials. That stand was sufficient for the purpose, and necessary for that occasion, but in continuing the subject I must bring forward another phase of the act of percolation. This influences the percolate materially, especially regarding the permanence of the percolate, a vital point when we connect percolation with the class of preparations known as fluid extracts. Inasmuch as percolation is mainly applied by pharmacists

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* Read at the Fifth Session.

to the making of fluid extracts, I shall refer to this class of preparations hereafter in connection with our subject.

In an editorial, "American Journal of Pharmacy," 1859, we find the following from the pen of the late Professor William Procter: "The question to be resolved is,—can we make fluid extracts that contain all the valuable ingredients of the drugs that are capable at the same time of resisting the mutual reaction of their proximate principles, and such external agencies of deterioration as heat, light, and oxygen, and thus be entitled to the character of permanent preparations?" It seems that Professor Procter foreshadowed the subject as to permanent fluid preparations. At this day, in reply to the above query elucidated more than twenty years, who will argue that however carefully a fluid extract be made by percolation it is a "permanent" preparation? Will any of our pharmacists assert that by any recognized system of maceration or percolation a line of preparations can be made from officinal powders that is permanent? Let us admit, however, that we have progress. Improvements have been brought forward during the two decades that have passed since fluid extracts were introduced. The original idea of percolation with two, or even three, menstruums for one powder, and subsequent evaporation and mixing of the percolates, is improved upon by the use of, as a rule, *one* menstruum, and little, if any, evaporation.*

As a result, fluid extracts now are less liable to precipitation than formerly, but they are far from permanent. Still prone to change upon standing, one of the results is the production of precipitates, and to a very great extent these precipitates result from the reaction between menstruum and powder during the act of percolation, to the consideration of which this article is devoted. Before, however, entering into the line of argument I shall assume that, as a class, precipitates are objectionable, whether composed of inert materials or of active medicinal agents. More than twenty years ago no less an authority than Professor J. M. Maisch wrote: "With some well-known exceptions, a liquid medicine is the more pleasing to the eye the more transparent and clear it is. Those rendered turbid by some partially soluble substance are generally unsightly and often repulsive." These remarks are true to-day. Physicians object to even muddy fluid extracts, pharmacists feel annoyed and discouraged when they find their

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* It is my opinion that the reserved percolate idea, with perhaps a few exceptions, will pass away before many years, and then we will have another step towards improved liquid preparations of plants. I do not reason from the stand that is so popular just now, the supposed evil effect of the heat which is necessary to evaporate the reserved percolate, which, in my opinion, is a very much overestimated point. I base my argument upon the fact that in most cases the reserved percolate is, or should be, of little value.

bottles partly filled with sediment, and this trouble (sediments) is the rule and not the exception. Thus we find the study of precipitates of as great interest to-day as it has been during the past. It is worthy of our attention,—indeed it demands our study. Inasmuch as my present line of argument differs from any that it has been my privilege heretofore to find tabulated, I shall refer briefly to the theories that have to my knowledge been offered in explanation of their formation, and which, to a greater or less extent, account for certain classes of precipitates.

Oxidation.—Certain organic bodies are prone to unite with oxygen and form new compounds, often of an insoluble nature. It has been shown that some of these examples are not a simple combination of oxygen with the organic substance, for, according to the investigations of De Saussure, oxygen sometimes unites with hydrogen of the organic matter, water being eliminated and an insoluble body formed. In such cases it will be seen that the sediment is not actually an oxidized organic body, although its formation is due to oxidation, and Berzelius has suggested for such deposits the term *apotheme*. Such as consult the early writers on the subject of fluid extracts will note that they recognize the formation of apotheme as of importance, and the support of Professor Maisch many years ago for menstrua containing more or less sugar was, I believe, mainly based upon the *deoxidizing* property of sugar.*

I know that it is the custom to make oxygen responsible for most of the changes which take place in organic solutions, but I cannot, in a large number of experiments, find that the precipitation of percolates proceeds any faster in an atmosphere of oxygen or of ordinary air than it does in an atmosphere of hydrogen gas or carbon dioxide. While it is true, therefore, that the presence of oxygen influences decomposition under certain conditions, it is also true that other influences or agents are at work and aid in the formation of precipitates.

Change of Solvent Power of Menstruum by Evaporation.—If a menstruum be altered in composition by the evaporation of some ingredient which is more volatile than another, a change follows in the solvent power of the menstruum which remains. This may necessitate the subsequent precipitation of organic matter, to a greater or less extent, in consequence of its insolubility in the new menstruum, although it was perfectly soluble in the original. There is no need of our drawing upon the idea of chemical change for such deposits, and I find that this phase of the subject has been clearly expressed in an article written by Mr. Henry Thayer twenty-two years ago, as

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* I am not certain but that in some cases we have been hasty and inconsiderate in radically thrusting sugar from all fluid extracts. I doubt if glycerin will answer the purpose nearly as well as sugar in some instances.

follows: "These precipitates are not due to the absorption of oxygen; they are not apotheme. They deposit the same when evaporation is conducted in a vacuum. They are medicinal principles deposited because the menstruum loses its power of solution in consequence of the evaporation of alcohol."* It is well known that the greatest amount of precipitation in our fluid extracts, from the result of change in alcoholic composition, comes from the addition of the reserved and evaporated percolate. As I only consider in this paper the direct percolate, I shall not consume time with any remarks upon that subject.

Change of Temperature.—During low temperatures precipitation results from inability of the cold liquid to hold in solution matter which was perfectly soluble while warm. This fact must be familiar to all pharmacists, for often the simple reduction of a few degrees will cause the percolate to become muddy, and upon standing it will throw down a sediment if the low temperature be maintained. One difference between such a precipitate and the others, which I have named, resides in the fact that the greater amount of it disappears when the bottle is warmed. Often such precipitates are more or less crystalline, and it is not uncommon to find, with certain preparations, the sides of large fluid extract containers studded with masses of crystals during very cold weather.

Chemical change outside of oxidation undoubtedly often results. The various principles contained in our plants are so connected that it seems as though under certain circumstances a point is reached where, without a sign, the entire soluble material assumes an insoluble form. Sometimes these changes take place gradually until the entire soluble solid material seems to have changed into insoluble; then again the alteration is of such a nature as to lead to the belief that there is no change, until suddenly the entire contents of the bottle solidify. As examples I can name the gelatinous magmas which form more or less frequently in such preparations as fluid extracts of Galium aparine and Chionanthus virginica, and the brown magmas of the fluid extracts of that class of astringent plants which, like Geranium maculatum, Stillingia sylvatica, etc., contain an abundance of red tannates. It will be found that such magmas result from the destruction of almost the entire coloring-matter of the former extract, and the liquid which filters from them, if any there be, is almost trans-

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* It is partly for this reason that the attempt has been made to bring the last percolate to the same composition as the first, by the addition of a certain amount of alcohol. Even if the alcoholic strength of the two liquids be made identical, the solvent powers of each differ from the other, therefore this process cannot entirely overcome the objection. It is a step in the right direction, however, and an improvement.

parent. These precipitates or magmas, as a rule, refuse to dissolve in a menstruum of the alcoholic strength employed to make the original extract, or in any mixture of alcohol and water. They are new substances, and to explain their formation we must draw upon the idea of chemical change.

Light.—The action of light is said to alter certain bodies in solution. That this is true with metallic salts, especially of silver, is a matter of familiarity. I am not, however, conversant with a single instance in which light caused the formation of an insoluble body in a fluid extract. In one case where it seemed conclusively to be the agent, careful experiments that I instituted upon the subject proved that it had nothing to do with the change, heat being the real agent. It is certain, however, that light will affect vegetable powders, and it may affect fluid extracts so as to produce precipitation.

I have now finished the brief review of the accepted causes for precipitation in percolates. I believe that I have named all the theories that have been heretofore introduced in explanation of their formation. The result of my observations and study of precipitates has convinced me that the larger part of the permanent sediments which form in most of our fluid extracts arises from a cause heretofore unconsidered. They are neither the result of decrease of temperature, of oxidation, nor of chemical change. They follow rather physical laws than chemical laws. To investigate them we must depart from the exclusive department of the chemist and pharmacist, and consider such forces as diffusion, the motions of currents, and the influence of various solvents. Perhaps the remarks which follow may open up a new line of thought, a worthy subject of research.

Heretofore, as far as I can learn, we have accepted the idea that a percolate from a powdered plant is a solution of substances in one solvent, if the act of percolation has been conducted with one menstruum. If, for example, a powdered plant be percolated with dilute alcohol, we have been led to study the subject as though the menstruum, dilute alcohol, passes through the powder, dissolving in its course the various bodies that are soluble in dilute alcohol, and we accept that at last this menstruum with its dissolved matters passes from the exit of the percolator. It is also often accepted that the dissolved material of various portions of a percolate is the same, excepting in amount. These conclusions are doubtless erroneous. If we use dilute alcohol (or any other mixture of alcohol and water) throughout the entire process, the menstruum which holds the solid matters in solution is not simply dilute alcohol; and the dissolved matters of a percolate differ in composition and in general properties at various stages of the operation of percolation. Indeed it will be found that at a certain stage in the operation with many bodies, especially such as contain gum-resins or gums and resins, the percolate will change and become rich in bodies that were only slightly extracted by the first part of the menstruum. As an example of this fact I will cite experiment No. 5, which shows the percolate of a fifty-pound experiment with cannabis indica. It will be noticed that the first part of the percolate has a reddish-brown color, while the latter part is deep green. The menstruum used was strong alcohol. Examples of this nature are not usually so marked in appearance, but it is not unusual to find a sudden change in the properties of a percolate, and it will be found that after this change the two portions of percolate will precipitate if mixed together. Arguing from such a stand, the term we use regarding the percolate is hardly proper, even though the same be collected in one vessel, for it is a number of different solutions instead of a single solution. The term percolate does not convey the idea of plurality, and from the point I now ask that the act of percolation be studied this difference in composition must be considered, even if one strength of liquid be used as a menstruum and the percolate be collected in one vessel.

In explanation, as a first consideration, I shall call attention to the fact that commercial powdered plants contain more or less water. Moisture is present in apparently dry plants in greater proportion than the larger number of pharmacists actually realize until they personally examine into the matter. This point has been frequently named, and our worthy secretary was induced to notice the subject in a former number of the "Journal of Pharmacy," 1872, p. 7. Some plants are very hygroscopic, and will absorb and hold from five to fifteen pounds of water to the hundred. Some plants, as is well known even in dryest weather, require special exposure in a drying closet before they can be powdered, and after powdering they again absorb the moisture upon exposure. When these commercial powders are submitted to percolation, the first part of the percolate carries the water, and consequently differs from the latter portion in actual alcoholic composition, even though one menstruum is used throughout. As a result, the first portions often contain, of gums and bodies more soluble in water than in alcohol, larger amounts than the last portions can dissolve; and the last portions may contain a larger proportion of resins, oils, and other bodies less soluble in a dilute alcoholic menstruum. Thus we find that when percolation is conducted according to the accepted ideas of the present day the dissolved materials in the first part of the percolate, and which are much less soluble in a stronger alcoholic menstruum, may be so great as to be partially insoluble in the entire mixed percolate. This rule applies likewise to the resinous and fatty substances which are often held in solution by intermediate or other parts of the percolate in larger proportion than it is possible to dissolve in the mixed percolate. As a consequence, after the full percolate is mixed a gradual separation of each of these classes of substances follows. Naturally, therefore, such an entire percolate is not a single body (as it is obtained), but a mixture of percolates, each of different alcoholic strength. They cannot be separated by any sharp line of demarcation, but are dove-tailed together, passing continuously from one to another. It is safe to argue that under these circumstances, if the entire percolate be divided into small portions as it passes, the aggregate amount of precipitate will be less than if the several portions are mixed, or that the precipitate will form more slowly. This is a fact, for in practice the first part of a percolate and the last part, if kept separate, will each for a time hold its dissolved matters more perfectly than if the entire percolate be mixed, or than if equal parts of the first and the last of a percolate be mixed.

It will certainly be clear to all that the moisture present in a powdered drug should exert an influence upon the percolate and in the manner that I have described, and that the proportion of moisture should materially influence the permanence of the preparation, and to an extent account for a certain class of precipitates. It will often amount to as much water as is contained in the evaporated reserve, and we know that it has been recommended that to this a certain amount of alcohol be added in order that the alcoholic strength of the finished fluid extract be kept as nearly as possible that of the original menstruum. Lastly, if any will experiment upon one powder different portions of which are more or less moist, it will be found that an increase of precipitate will follow in such as contain the largest amount of water, alcohol being used to percolate in each case. The foregoing very natural cause for certain sediments in our fluid extracts should be sufficient to induce careful pharmacists to prepare fluid extracts from dry powders where dried plants are used, and while our Pharmacopœia is silent upon the subject, we all know that the intent is to recognize perfectly dry powders.

Let us cast aside now the foregoing cause of precipitates, for together with those I have previously named we may do so and have a class of precipitates that remain to be accounted for, and which seem to form in greater abundance in proportion to our care in carrying on the process of percolation. Let the powder be ever so dry and carefully percolated; place the percolate in the dark or the light; saturate it with hydrogen gas, or carbon dioxide, and the sediment follows. This perplexing fact has embarrassed pharmacists since Professor Procter foreshadowed the subject more than twenty years ago. It is plain that we cannot overcome the difficulty by means of any system of percolation, and we cannot satisfactorily account for the formation of these precipitates by arguments heretofore advanced. The most careful operator is as much troubled with objectionable products, as far as precipitation is concerned, as the careless; and perhaps the more careful the process of percolation, the greater will be the proportion of precipitate which follows when the entire percolate is mixed. I have yet to find the pharmacist that does not feel the pertinence of my remarks on this subject, and I well remember some years ago the earnestness with which the late Professor W. B. Chapman commented on the fact that he could not overcome the difficulty, however careful he might be regarding the operation. I shall now introduce the explanation, in my opinion, for the larger part of ordinary precipitates. Especially do I include such as commence to form as soon or even before the operation of percolation is suspended, and continue to deposit for weeks, months, or even years.

First, let me call attention to what has been conclusively proven to my mind, viz., *the solvent power of the menstruum actually varies at different stages of the operation of percolation exclusive of variation which could be attributed to the presence of more or less water.* I refer still to a menstruum that is not changed in alcoholic strength from the beginning and until the close of the operation of percolation. That such a menstruum can differ in solvent action is not generally recognized, if at all. I cannot find a reference to the idea in the works of the writers most likely to have noticed the subject. In continuing the argument, therefore, I shall first refer to the materials which we expect to exhaust with our menstruum.

Dried plants contain several widely differing and closely connected principles. Thus we have gums, and extractive matters related to gums, and which are very soluble in water, and almost insoluble in alcohol, and are variably soluble in different mixtures of alcohol and water. Upon the other hand even the same plant may contain fixed and volatile oils, resins, oleo-resins, and resinoid bodies, which are soluble in alcohol and insoluble in water. These bodies, together with other substances which are variably soluble in alcohol and in water, such as glucosides, tannates, glucose, sugar, chlorophyll, alkaloids, and their salts, and the salts of minerals, furnish us a medley of different materials. Every plant contains more or less of these substances, and when percolation is carefully performed there is scarcely the part of any carefully made percolate which is not saturated with some organic body or mixture, and the slightest alteration of solvent power of menstruum after percolation tends to throw down this body in part or wholly as a precipitate. Thus it follows that if our mixed percolate be not of the composition of the percolate at its various stages as regards solvent power of the menstruum, precipitation will follow. That it is not the same is explained by the following argument.

From the moment our menstruum enters the powder, it commences to dissolve matters that are soluble in that menstruum. This forms at once a *new menstruum*, and which has the power to dissolve substances that are only partially soluble in the original menstruum. As this liquid percolates through the powder, it takes up more and more of the matters which are very soluble in it and becomes an increased (or occasionally decreased) solvent for substances which the original menstruum could scarcely dissolve. These various bodies in solution alter the solvent power of the menstruum to such a degree as to enable it to dissolve substances which may be perfectly insoluble in the original menstruum. In this manner resins and oils may be dissolved to a more or less extent in a water menstruum, although the purified resin or oil may be practically insoluble in water; and often we may obtain from a watery extract by simple agitation with solvents such as carbon disulphide, substances in considerable amount that are perfectly insoluble in water. Thus it is that during the operation of percolation a constantly changing menstruum is passing through the powder even though the original menstruum be unchanged. The percolate in accordance is variable in composition and in solvent powers even if it be spoken of as though it be one menstruum. In reality the percolate is an association of solutions in which there is seldom a line of demarcation. It may be considered as a collection of percolates, perhaps numberless, each having a separate dissolving power, and each containing varying amounts of bodies which are more or less soluble in the other parts of the percolate, and which, if the menstruum be altered in solvent powers, are liable to precipitate.*

Why the Percolate Precipitates.—Let us have in mind the fact that our percolate is not one body, but an association of solutions, or in other words an association of menstruums. By agitation we mix these solutions and a new menstruum results. An equilibrium is established as far as the proportion of liquid and solid matter is concerned, but *not* an equilibrium as regards the solvent action of the new liquid. Upon the contrary, a strain (tendency to precipitate) is placed upon certain bodies that were either freely dissolved by the first part of the percolate or by the latter portion. It may be that some of these substances are at once precipitated, or that more or less time is required before they separate. If the operation of percolation was excellently performed, by which we understand that the first portion

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* I cannot exclude even the last portion of many percolates from this law. There are substances which seem to be prevented from dissolving if certain other bodies are in great proportions. Such appear more abundantly in intermediate parts of the percolate, or even in the last portions, and are more or less precipitated when the percolate is mixed. Especially do we meet with this class of precipitates when we evaporate a reserved percolate and mix the residue with the first percolate.

of the percolate is thick with certain dissolved matters, while the latter portion is comparatively free from them, a greater change in solvent power of the whole mixed menstruum results, than when the percolate is of near uniform composition, and we may therefore expect a larger precipitate.

Why the Precipitate Continues to Form.—If the foregoing is considered as the only cause for precipitates in certain fluid extracts, it may be asked why an equilibrium is not established in a short time, and the precipitation cease. Let us not accept that a precipitate must at once form, even under such conditions. Some time is often required before bodies separate from solution, that refuse at the same temperature to redissolve in the liquid from which they were separated. Even with some solutions of definite chemicals, a precipitate, as is well known, refuses to form until the vessel is permitted to stand a certain length of time. Occasional stirring is required, or the operation may under certain conditions (especially with certain crystalline salts) be hastened by rubbing the inside of the vessel with a rod. In like manner the substances which are rendered insoluble by the mixing of the percolate are not necessarily at once cast down. They may continue to separate during a greater or less period of time, and from these bodies alone a series of precipitates result. Now we come to another point. Let us continually bear in mind the fact that all of the substances which are held in solution are a part of the solution, and any precipitation of dissolved matter alters the solution and the solvent power of the liquid. Thus as these bodies separate, the menstruum actually changes, and as it changes in composition, substances which were readily dissolved by the original liquid become insoluble. These separate gradually, and as they separate alter the liquid, and bodies which were soluble become insoluble in the new solution, and separate. Thus apparently by a series of steps the percolate changes in composition and in solvent powers, each change being followed by the precipitation of certain substances. In reality the process is almost continuous and often without a line of demarcation, although usually sediments differ in appearance and in composition at various stages of their growth as the different classes of bodies precipitate, often forming in distinct strata (see experiments Nos. 1 and 6). In consequence of the foregoing we find that a percolate may be filtered or decanted from time to time, and in each case a sediment will be obtained.*

Reasoning from the foregoing, it should follow that if portions of

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* There is seldom a necessity for filtration of a fluid extract while in the hands of the maker. If a fluid extract be filtered a certain amount of evaporation must follow, which alters the menstruum and hastens and increases subsequent precipitation.

the extremes of a percolate be mixed, greater immediate precipitation should result than is the case with similar parts of the extremes unmixed. This is upon the principle that the greatest difference in composition is found in the extremes of a percolate, and as a consequence the greatest change in equilibrium as to solvent power of the solution must be from mixtures of the extremes. I have tried many experiments upon this point, and as a rule the principle is supported in the most positive manner. Often the mixture becomes at once opaque and immediately throws down a precipitate. Sometimes a precipitate follows in a few hours, while like amounts of the extremes preserved separate remain for days unchanged. As examples I offer the following specimens, and will say that the experiments were all instituted after the weather commenced to get hot, so that precipitation from change of temperature (warm to cold) could not interfere with the result; and that the powders were exposed in a drying closet at a temperature of 150° F. for twelve hours before percolation.

Experiment No. 1, *April* 19*th*, 1881.—Eighty pounds of hydrastis canadensis were percolated with a mixture of three parts of alcohol and two parts of water. Of this first percolate and of the fiftieth pint of percolate six fluid ounces were reserved. Two fluid ounces of each were mixed, the remaining four fluid ounces of each being kept separate.

Remarks.—After twenty-four hours the first and second percolates were clear. The mixture had deposited a *brownish*-yellow sediment. After four days the second percolate was clear. The first percolate had thrown down a slight *yellow* sediment. The mixture had increased its precipitate. After eight days a *greenish* precipitate appeared in the second percolate; after two weeks the *heaviest* precipitate was in the first percolate. The precipitates at this date, July 7th, range as follows: First percolate heaviest, color deep yellow; second percolate lightest, color greenish; mixture between, color greenish-yellow.

Experiment No. 2, *April* 21*st*, 1881.—Fifty pounds of rhamnus purshiana were percolated with a mixture of alcohol three parts, water two parts. The percolate was divided as in experiment No. 1, the second percolate being of the thirtieth pint.

In six hours a slight precipitate was observed in the mixed percolates. In two days a precipitate exhibited itself in the first percolate. In ten days precipitate observed in second percolate. At this date, July 7th, the precipitates range as follows: First percolate, heaviest precipitate, deep yellow; second percolate, lightest precipitate, greenish-yellow; mixed percolate, between others in amount and in color.

Experiment No. 3, *April* 21*st*, 1881.—Eighty pounds of leptandra virginica were percolated with a mixture of alcohol three parts, water two parts. The percolates were reserved as in experiment No. 1.

In two days brown precipitate appeared in the mixed percolate, none in the first or second. In twenty days there was a precipitate in the first percolate. At this date, July 7th, the precipitates of the first and mixed percolates are about equal, and a slight precipitate has appeared in the second percolate.

Experiment No. 4, *May 9th*, 1881.—Eighty pounds of valerian were percolated with a mixture of alcohol four parts, water one part. The percolate was reserved as in experiment No. 1.

In twenty-four hours a slight precipitate appeared in mixture. In five days there was a precipitate observed in first percolate. July 7th, we find a slight precipitate in the second percolate. The precipitates of the first percolate and in the mixture are about equal in amount.

Experiment No. 5, *May* 10*th*, 1881.—Eighty pounds of cannabis indica were percolated with officinal alcohol (specific gravity 0.835). The percolates were reserved as in experiment No. 1.

The first part of the percolate was a dark red-brown. The remainder of the percolate was deep green. When the first and second portions of the percolate were mixed, a muddy mixture immediately resulted. In two hours this settled, forming a green precipitate. July 7th, green precipitate in mixture; slight brown precipitate in first percolate; second percolate unchanged.

Experiment No. 6, *May* 11*th*, 1881.—Fifty pounds of true damiana were percolated with a mixture of alcohol three parts, water two parts. The percolates were reserved as in No. 1. The second reserve being taken from the thirtieth pint of percolate.

In six days a light greenish precipitate appeared in the mixture. The first and second percolates remained clear. In eight days there was a greenish precipitate in the first percolate, equalling in amount that in the mixture. July 7th, the first percolate contains the largest precipitate; it has a greenish color. The mixture contains a greenish precipitate, interspersed with small yellow crystals. The second percolate contains a small amount of a golden-yellow crystalline precipitate. It will be seen that in this case the extremes form different deposits, and that the mixture contains both.

Experiment No. 7, *May* 14*th*, 1881.—Fifty pounds of scutellaria were percolated with a mixture of alcohol three parts, water two parts. The percolate was reserved as in experiment No. 1. The second reserve was from the thirtieth pint of percolate.

In twenty-four hours greenish precipitates exhibited themselves in both the first percolate and the mixture, heaviest in the mixture. In two days there were precipitates in all. July 7th, found the inside of each bottle covered with a skin of precipitate, and interspersed with little warty resinous-looking concretions. There was a heavy precipitate, greenish-brown in each.

Experiment No. 8, *May* 14*th*, 1881.—Fifty pounds of yellow dock root (rumex crispus) were percolated with a mixture of alcohol three parts, water two parts. The percolate was reserved as in experiment No. 1. The second reserve was from the thirtieth pint.

In two hours there was a decided precipitate in the mixture. In twenty-four hours there was a precipitate in all, heaviest in the first percolate. The color of these precipitates was of a dirty yellow. July 7th, there was a precipitate of three-sixteenths of an inch in thickness in the first percolate. This precipitate was dark yellow, but interspersed with bright yellow minute crystalline tufts. The mixture contained about half as much sediment as the first percolate, and the second percolate contained about half that of the mixture. These precipitates are evidently chrysophanic acid more or less impure.

Experiment No. 9, *May* 21*st*, 1881.—Eighty pounds of cinchona compound mixture was percolated with a mixture of alcohol three parts, water two parts. The percolate was reserved as in experiment No. 1.

In twenty-four hours there was a precipitate in the mixture. July 7th, there was a precipitate in all, heaviest in the mixture, lightest in the second percolate.

Experiment No. 10, *May* 21*st*, 1881.—Eighty pounds of eupatorium purpureum were percolated with a mixture of alcohol three parts, water two parts. The percolate was reserved as in experiment No. 1.

In two days they all contained deposits of yellow needle-like crystals, heaviest in second experiment and in the mixture. These crystals continued to grow until, at the time this is written (July 7th), they fill about one-fourth of each bottle. They are in the form of acicular needles, crystallizing in radiating tufts, some measuring half an inch in length. They are heaviest and in greatest amount in the first percolate.

Experiment No. 11, *May* 21*st*, 1881.—Eighty pounds of taraxacum were percolated with a mixture of alcohol three parts, water two parts. The percolate was reserved as in experiment No. 1.

In twenty-four hours there was a yellowish-white precipitate in the mixture and the first percolate. July 7th, there was a precipitate in the first percolate of one-fourth of an inch in depth, composed of a light-colored lower stratum and an orange-colored upper stratum. The mixture contains a thin precipitate, divided, like that of the first percolate, into a light-colored lower stratum and an orange-colored upper stratum. The second percolate contains a crystalline aggregation over the bottom of the bottle, and this is perfectly white.

Experiment No. 12, *May* 21*st*, 1881.—Forty pounds of logwood were percolated with dilute alcohol. The percolate was reserved as in experiment No. 1. The second reserve was taken from the twenty-fifth pint of percolate.

After thirty days there had been no change. July 7th showed a slight yellow precipitate in the mixture.

In commenting upon the aforementioned experiments, I will say that the powders were thoroughly dried. The result supports my theoretical explanation of the formation of a line of precipitates by simply mixing a percolate, and without calling upon chemical action, oxidation, etc. I can say that many other experiments instituted in like manner gave similar results. Arguing, then, simply from the theory of our system of percolation, and comparing it with the evidence afforded by experience and experiments, I must say that it does not seem probable that we shall ever, by percolation alone, succeed in making a line of permanent fluid extracts from dry plants. The most important of steps, then, is to adapt our menstruum so that it may hold in solution the *medicinal* principles of each plant, and thus render the precipitate which forms inert; for the precipitate *will* follow. Inasmuch as our coming Pharmacopœia embraces a line of fluid extracts made by percolation, and as percolation alone cannot produce permanent liquids (if there be any exceptions I have not found them), let us not criticise the committee if, as is to be expected, precipitates continue to form in officinal fluid extracts. It will be noticed that the evidence I bring forward here in the way of experiments is mainly circumstantial, but it is of such a nature as to be almost conclusive. Those that care to follow the idea will find it supported by experiments upon the nature of the precipitates. It is scarcely necessary for me to consume further time upon this point, and I cannot lengthen this paper by the introduction of another subject without making it tiresome.

ON FLUID EXTRACT OF JABORANDI AND ON THE PREPARATION OF PILOCARPINA.*

BY GEORGE W. KENNEDY.

Query No. 22.—Jaborandi. Determine the best method for making a fluid extract and for extracting its active principle (pilocarpina).

During the past few years a number of articles have been written on this subject, making their appearance in pharmaceutical literature,

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* Read at the Third Session.

giving different processes for preparing the fluid extract and also the alkaloid pilocarpina.

In reference to the fluid extract I find writers disagree very considerably as to the best menstruum which should be used. One writer recommends a menstruum composed of one-third alcohol and two-thirds water; another favors a menstruum containing fifty per cent. of alcohol; and another claims a menstruum containing not less than eighty-four per cent. of alcohol to be the best.

In devising a formula it is absolutely necessary to take into consideration the active constituents of the drug, if they have been isolated, and their solubilities; then you can proceed intelligently to formulate a process which, when completed, will hold all the active constituents of the drug in perfect solution.

The question may then be asked: What are the desirable constituents of jaborandi which should be present in the fluid extract or any other preparation of the drug? According to good and reliable authority we have a volatile oil, an acrid resin, and pilocarpina. The first two are not of so much importance as the last named. Both Hardy and Gerrard believe they have discovered a second alkaloid, of which, at this time, very little is known.

The volatile oil, as examined by Hardy, who obtained about half of one per cent. from jaborandi, was found to consist of three distinct hydrocarbons, one of which he named pilocarpene, besides an oxygenated oil. The true therapeutic properties of the acrid resin have not fully been determined; it is insoluble in water and soluble in alcohol.

Pilocarpina, the principal constituent of the drug, and to which special attention should be given in preparing any of the preparations, has been found to be sparingly soluble in water, but to dissolve freely in alcohol, ether, and chloroform. Knowing then the best solvents for the drug, there can be no difficulty in constructing a formula.

In making the various preparations of the drug, particular attention should be directed to the quality of the drug used. The stems should be rejected, as they have been found to contain little if any of the alkaloid pilocarpina. Some of the specimens, as found in the market, contain a great deal of inert drug, the leaflets being of a brownish-yellow color, which are unfit for use, and should be cast to one side. Those only should be selected having a uniform dark-green color, which will be found to possess the full virtues of the drug. If they are purchased indiscriminately and converted into manufactured preparations one can readily understand why one man's fluid extract is much stronger or superior to that of another.

Then again, according to Budee, the leaves of piper lætum appear in the market as Brazilian jaborandi, and in those he failed to demonstrate the presence of an alkaloid.

There are a number of other South American plants sent into the market and sold as jaborandi simply because they have some resemblance to the true variety and possess diaphoretic properties, and these may or may not be inferior to the pilocarpus pennatifolius.

In making preparations of the drug, no matter for what purpose, either as an experiment or for medicinal use, only the leaflets of pilocarpus pennatifolius should be used in order to give proper credit to the drug.

In constructing a formula for the fluid extract, bearing in mind that the active constituents are sparingly soluble in water, freely so in alcohol, ether, and chloroform, I would recommend the following, which in the hands of the writer has proved satisfactory both pharmaceutically and medicinally:

Fluid Extract.—Take of pilocarpus, in fine powder, sixteen troy ounces; alcohol (75 per cent.), sufficient quantity. Moisten the powder with eight fluid ounces of the menstruum and carefully pack in a conical glass percolator; cover the surface of the moistened powder with a disk of paper, and pour upon it eight fluid ounces of the above menstruum; watch the lower orifice of the percolator and, when the liquid commences to pass, close it with a cork and cover the top with a lid, which should fit closely to prevent evaporation, and permit it to remain in this condition for four days; the cork should then be removed and percolation permitted to proceed slowly,—not faster than forty (40) drops per minute. The above menstruum should be used from time to time as required. Reserve the first fourteen fluid ounces which pass, and continue percolation until the drug is thoroughly exhausted; evaporate to two fluid ounces, and mix with the reserved portion when the extract is completed.

Pilocarpina, or *Pilocarpia*, as it is called by some writers, at first was named jaborandina, but since the name had already been appropriated, it is now called pilocarpina.

Quite a number of processes have been given for the extraction of this alkaloid, each author claiming for his process advantages over the other, either by furnishing a larger yield or a less difficult process of manipulation. I would recommend the following process, claiming it to be less expensive and less troublesome:

Take of true jaborandi leaves (pilocarpus pennatifolius) and reduce to a fine powder; moisten the drug with water acidulated with muriatic acid in the proportion of a pint of the former to one fluid drachm of the latter; pack in a glass conical percolator and pour on a sufficient quantity of the above menstruum till it commences to drop from the percolator; close the lower orifice with a cork, and cover the top to exclude air, and allow it to remain in this condition forty-eight hours; afterwards remove the cork and continue percolation with the same menstruum until two pints are obtained for every pound of drug used; transfer to an evaporating-dish and, by means of a water-bath, evaporate to the consistence of a soft extract; add a sufficient quantity of warm water, enough to permit of filtration; then filter, and treat the filtrate with sodium bicarbonate in slight excess, which is known when effervescence ceases. The object of the soda salt is to decompose the chloride of pilocarpina; the result is liberation of carbonic acid gas, chloride of sodium, and pilocarpina. Then, with a large quantity of chloroform, using one ounce for every ounce of filtered extract, agitate occasionally for ten hours; allow it to subside; pour off the chloroformic solution and evaporate spontaneously; redissolve in chloroform, and evaporate as before. Pure pilocarpina is left, and, as thus obtained, is a soft, glutinous mass; is non-crystallizing, but produces crystalline salts. Its salts, with the organic acids, are uncrystallizable, according to Dr. Squibb.

With iodine, a heavy reddish-brown precipitate is produced.

Tincture of iron, no change.

Salycilic acid, no change.

Bichromate of potash, light blue color; by the addition of sulphuric acid, color is destroyed.

Chloride solution of gold, a heavy lemon-yellow colored precipitate.

ON POWDERED EXTRACTS.*

BY C. S. HALLBERG, CHICAGO.

QUERY 32. Powdered extracts present some advantages at the dispensing-counter. What solid extracts may advantageously be kept in that form, and how are they best prepared?

THE powdered extracts as found in the market are not very satisfactory, the slight exposure which they receive during dispensing being sufficient to, in a short time, render them in a hard mass more difficult to manipulate than the ordinary solid extracts.

The writer, after a number of experiments, concludes that this is due to the small percentage of admixture used.

Although powdered extracts are made containing respectively 10 per cent. of admixture, sufficient of inert matter to replace the moisture lost, and such proportion of diluent as to make the extract represent a certain proportion of the drug, these apparently varied amounts will not exceed 10 per cent. of the foreign substance.

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* Read at the Fifth Session.

The following trials were made with a view of determining the length of time this small percentage of admixture would prevent the extract from losing its powdered form, also the comparative value of milk-sugar and dextrin as an addition:

The extracts were properly prepared with officinal menstrua, carefully evaporated and dried, then powdered with milk-sugar and dextrin respectively added.

With Milk-sugar.		With Dextrin.	
Ext. belladonna, Atc.,	10 per cent.	Ext. belladonna, Atc.,	10 per cent.
“ “ “	20 “	“ “ “	20 “
Ext. nux vomica,	10 “	Ext. nux vomica,	10 “
“ “	20 “	“ “	20 “
Ext. opium,	10 “	Ext. opium,	10 “
“ “	20 “	“ “	20 “

Although these samples were put in perfectly dry bottles, securely corked, and kept in a moderate temperature, they in six months begun to cake, in one year became quite hard, and by this time, eighteen months after preparation, have run into an almost solid mass. The vials in which they were contained were not uncorked.

The results, coupled with observations during the last few years on powdered extracts as kept in the pharmacies, convince the writer that the percentage of admixture is too small to make this class of preparations of any value at the dispensing counter.

The standard of strength adopted by the German Pharmacopœia, an equal amount of diluent and extract, is the smallest addition practicable to produce a permanent powdered preparation, *if the solid extract should be taken as the standard of strength, and not the drug from which it is primarily obtained.*

Recent experience, however, supports the theory that too great a variation exists in the yield of at least some solid extracts, and necessarily a lack of uniformity in medicinal strength, without any corresponding variation in the crude material.

The following will prove as an illustration: A lot of nux vomica was exhausted by percolation with menstrua of different alcoholic strength, with the annexed resulting percentage yield:

Alcohol, 95 per cent.	Yield of extract, 10 per cent.
“ 85 “	“ “ 12 “
“ 75 “	“ “ 14 “
“ 70 “	“ “ 16 “

A portion of the same nux vomica was exhausted with benzin, which left upon evaporation about 5 per cent. of a bright greenish-yellow fixed oil, which did not show any presence of alkaloids. The drug was subsequently exhausted with 85 per cent. alcohol, the yield of extract being 4 per cent., to which was added 6 per cent. of milk-sugar, and the mixture powdered. The result was a powdered extract of the strength of 10 per cent. of the weight of the drug, the usual strength of the officinal extract. It remained permanent as powder for nearly one year, and seems a tolerably satisfactory preparation of this troublesome extract.

The nux vomica used in these operations being from the same source, the difference in yield is solely attributable to the variation in the strength of the menstrua. The various extracts were of different colors, that obtained by alcohol of 95 per cent. being a light yellow, and then gradually assuming a darker brown shade as the alcoholic strength of the menstrua decreased and the percentage of extract increased.

The increased yield by the weaker alcohol was undertaken, as some authority recommends it, on the ground that while equally efficient as a solvent for the alkaloids, it would not so readily extract the fixed oil, and the percentage yield would be consequently smaller. As will be readily seen, the lastly obtained extract with 70 per cent. alcohol, being 16 per cent of the drug, is of 75 per cent. of the strength of the extract obtained by 85 per cent. alcohol, and only 60 per cent. of the strength of that obtained with 95 per cent. alcohol.

Herein lies the danger of adopting the extract itself as a standard of strength, as its medicinal action seems to be regulated by its percentage yield from the crude drug,—a standard so variable as to be influenced by so small a variation in the menstruum as 5 or 10 per cent.,—a lack of uniformity in the extracts of our most powerful remedies.

If so much diluent is used in the preparation of a powdered extract as to make the mixture represent 50 per cent. of the weight of the drug, these previous objections will be overcome. The diluent would be present in sufficiently large quantity to retain the extract in the powdered form. The crude drug being taken as a standard of strength, any variation in the yield of extract would not affect the strength of the powdered extract. The objection to this amount of dilaent, that it would make this class of preparations too bulky, would not be valid, as the extracts mostly used, the narcotics, would require this percentage of addition on account of their percentage yield of the crude drug. To show the relation which the yield of extract bears to different classes of drugs and to menstrua of different alcoholic strength, and also the proportion of diluent in a powdered extract, 50 per cent. of the weight of the drug, the following table was compiled.

This table contains the most usually employed officinal extracts, which were divided into three classes.

I. Containing the narcotic extracts, also extracts of digitalis and valerian:

	Percentage of Extract with Officinal Menstrua. Average Yield.	Strength of Powdered Extract as Proposed.	The Drug.
Aconite leaves,	20 per cent.	50 per cent.	100 per cent.
Belladonna “	25 “	50 “	100 “
Conium “	20 “	50 “	100 “
Digitalis,	25 “	50 “	100 “
Hyoscyamus,	20 “	50 “	100 “
Stramonium leaves,	20 “	50 “	100 “
Valerian,	12 “	50 “	100 “

The extract of valerian requires this large amount of addition owing to the oil it contains.

II. Containing the extracts of the more powerful remedies, made with strong or 85 per cent. alcohol as menstrua:

	Percentage of Extract with Officinal Menstrua. Average Yield.	Strength of Powdered Extract as Proposed.	The Drug.
Cannabis indica,	10 per cent.	50 per cent.	100 per cent.
Ignatia,	10 “	50 “	100 “
Nux vomica,	10 “	50 “	100 “
Mandrake,	10 “	50 “	100 “
Calabar bean,	2.5 “	50 “	100 “

The yield of extract of Calabar bean is the smallest in the list, and the large amount of diluent used would make the powdered extract represent one-twentieth part of solid extract.

III. Containing the remainder of the more important extracts, weak alcohol, and, in the last instance, water being used for extraction:

	Percentage of Extract with Officinal Menstrua. Average Yield.	Strength of Powdered Extract as Proposed.	The Drug.
Rhubarb,	30 to 40 per cent.,	50 per cent.	100 per cent.
Jalap (70 per cent. alc),	25 per cent.	50 “	100 “
Opium,	50 “	100 “	100 “

Extract of jalap was made with 70 per cent. alcohol, as is suggested in the National Dispensatory, which exhausts all the active principles of the drug, excluding inert matter, the yield of extract being correspondingly less.

The strength of the powdered extract compared with the solid extract would be in the following proportion:

In Class I the powdered extract would contain about one-half their weight solid extract.

In Class II the powdered extract would contain about one-fifth of solid extract; dispensed in comparatively small doses the bulk would not be objectionable.

In Class III the powdered extracts contain the extract in greater proportion, but, with the exception of extract of jalap, are not used much in the powdered form, and this would contain one-half its weight of solid extract and correspond in strength with the extracts of Class No. I.

As the percentage yield of opium amounts to 50 per cent., and sometimes exceeds it, it would of course be impossible to so dilute the extract as to conform with the standard adopted, namely, 50 per cent. of the weight of the drug. While it is true an exception is not desirable, still a powdered extract of this drug of the strength of powdered opium would be sufficiently concentrated and not lead to much confusion; it would then contain 50 per cent. of the extract.

How are powdered extracts best prepared?

In discussing the preparation of powdered extracts, the writer will not make any observations on the menstrua used or the process of extraction, but confine himself to a few remarks on the drying and powdering of the extracts. For smaller operations no vessel has as yet been satisfactorily used. Spreading the extract on glass plates should be avoided, as well as in thin porcelain dishes if they are considered valuable. A large, shallow, enamelled iron evaporating-dish is, up to the present time, the most satisfactory to use.

The extract, when of the proper consistency, should be very thinly and evenly spread, and gentle heat applied. A water or sand-bath can be used, but, preferably, the dish should be set in a drying closet heated by means of a steam coil. When the extract becomes brittle at ordinary temperature, it should be rapidly scraped out. During the operation care should be taken to guard against its coming in contact with damp air, and then immediately mixed with at least one-fourth the amount of the intended diluent.

This mixture should then be rapidly powdered in a perfectly dry, large Wedgwood mortar, thoroughly triturated with the remainder of the diluent, and at once transferred to perfectly dry wide-mouthed bottles, well corked, and kept in a dry, cool place.

Incorporating with the extract any portion of the diluent previous to its desiccation should not be undertaken, with the exception of a few alcoholic extracts, to which it can be added gradually as soon as the extract is brittle upon cooling, the heat being continued.

To the extracts of cannabis indica and valerian it can be added as soon as the alcohol has evaporated. *The object we try to attain in adding any diluent to the extract is to protect it from the air, and any agent accomplishing this purpose will also prevent the complete desiccation of the extract.* On the other hand, with an extract like valerian, the strong alcoholic menstruum rapidly evaporates, and the diluent absorbs the oil and prevents its further volatilization.

What is the best diluent?

An inert soluble solid, if such a material exists.

The writer has experimented with three different substances:

Dextrin does not yield satisfactory results, probably on account of its agglutinating property.

Milk-sugar has been used quite extensively, and answers the purpose probably better than anything that has been tried. It has the advantage of being considerably soluble in water and tasteless. Consisting of hard crystals, it serves to comminute the extract and form a homogeneous powder.

Rice flour has been used to some slight extent, and preserves the extract in its powdered form, but on account of its smooth nature does not make a very uniform mixture.

The dried salts, sodium sulphate, etc., have recently been suggested, but have not been used by the writer.

The accompanying samples were prepared by the ordinary equipments of a pharmacy, and are here for your inspection.

EMULSION OF COD-LIVER OIL.*

BY HIRAM E. GRIFFITH, OF NIAGARA FALLS.

QUERY 19. Give working formulas for the various pharmaceutical preparations of cod-liver oil in use in the United States, and of such as may appear desirable from other countries.

It was understood when the writer accepted this query that he was not to answer it in full, and he regrets that he has not had more time to work out a more extended reply; but, in fact, in his own business he has no demand for other than the emulsion of cod-liver oil with the hypophosphites.

Some four years ago the writer began experimenting with gum tragacanth to ascertain how little could be used and yet obtain the desired object, and the formula given below is nearly the same that he has been using since, and is using now. The tragacanth is in such small quantities as to be unobjectionable,—less than 4 grains to the ounce. Two of the samples presented are a year old, the other freshly made.

The writer has tried the last year all the emulsifying agents known,

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* Read at the Fifth Session.

and finds none that gives such entire satisfaction as gum tragacanth. The separation of this emulsion is slight, and it can be readily shaken together again. The formula is practicable in small and large quantities:

A. Tragacanth powd.,	grs. xliv
Glycerin,	℥vi
Hot water,	℥ij

Rub the tragacanth with glycerin and add the water and let stand until cold.

B. Hypophosphite of calcium,	grs. xxxvi
Hypophosphite of sodium,	grs xviij
Granulated sugar,	℥iss.
Hot water,	q. s , to f℥v

Make solution and filter and add water until the filtrate measures 5 fluid ounces.

Take of	
Cod-liver oil,	f℥vi
Bitter oil of almonds,	♏ xxv
Or, oil of wintergreen,	♏xl

Add first the flavoring to A., then gradually the cod-liver oil and B., alternately, and when finished stir thoroughly for two or three minutes with a Dover egg-beater.

ON THE MOST DESIRABLE MELTING-POINT OF PETROLEUM OINTMENT.*

BY CHARLES RICE.

QUERY 7. What melting-point is most desirable for petroleum ointment?

THIS query, which was referred to the writer for answer, has been frequently discussed, and may be briefly answered as follows:

Our present as well as former pharmacopœias contain two principal classes of unctuous substances intended for external application. One of these is the class of cerates, and the other that of ointments. These have generally been understood to have two entirely different functions, at least in the majority of cases, and for this reason they have been carefully kept apart, although they overlap each other in a few instances. A cerate, as the name already implies, is a "waxy" ointment, that is, an ointment stiffened with wax for the purpose of raising its melting-point. An ointment is intended chiefly for "inunction," and for this reason should possess a melting-point but little above that

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* Read at the Third Session.

of the temperature of the body. A cerate, on the other hand, is rather intended as a dressing, to be spread on lint, linen, or muslin, and to be applied to the injured surface.

These well-known distinctions furnish the clue to the solution of the question, at least from the standpoint of theory, and also from the standpoint of the physician. The writer has had an opportunity, during the past year, of learning the views and opinions of a considerable number of practitioners on this subject, and he only regrets that he cannot quote their statements and reports—which were made for another purpose than the drafting of the present paper—in full, and with their names attached. But he is at liberty to state that most of them, and among them the foremost dermatologists, pronounce the melting-points of several of the commercial petroleum ointments to be altogether too low. During the heat of summer particularly, and in the warmer sections of our country even in other seasons of the year, an *ointment* should not have a melting-point below about 40° C. or 104° F., and as it is easier to soften an ointment by heat, than to stiffen it by cold, it appears preferable to select a uniform melting-point for the year round, based on the requirements of the average summer temperature.

Petroleum ointment is principally desired by practitioners as a perfectly *bland, neutral*, and *inactive* base for suspending therein various topical remedies. Naturally this very property of blandness and neutrality will in many cases alone produce curative effects, because it will permit the natural healing process to proceed normally and uninterruptedly, provided the injured part is thoroughly covered so as to exclude the air.

In the opinion of most of the practitioners whose views have been solicited or tendered, *two* petroleum ointments of different melting-points are chiefly desirable. One of these, which could take the place of lard or simple ointment, or other low melting unctuous compound, should have a melting-point of 40° C. or 104° F.; and the other, which could take the place of cerate or of corresponding compounds of higher melting-point, should melt at a temperature of about 46° C. or 115° F.

The preceding would be an answer to the query, from the standpoint of the physician. But there is another feature connected with the query, which cannot well be separated from it, though it is not expressed in words. In fact, the question might as well have been formulated thus:

"What is the most desirable melting-point to be recognized by the next Pharmacopœia for petroleum ointment?"

While the pharmacist acknowledges the correctness of the distinction between ointment and cerate, and will doubtlessly agree with the opinion of the physician that there should be both a soft and a firm petroleum ointment, according to the purpose for which it is to be used, he will, on the other hand, most probably deprecate the introduction of more than *one* kind of simple petroleum ointment into the Pharmacopœia, because a multiplicity of them will surely result in confusion, both on the part of prescribers and dispensers, and, besides, because the likelihood of the pharmacopœial requirements being observed will diminish in proportion to the number of grades recognized, since it is out of the question for the retail pharmacist to prepare the article himself. Hence, from the standpoint of the pharmacist it will be safest—at least with our present knowledge and experience—to recommend the official recognition of that petroleum ointment only, which has the *lowest* melting-point declared suitable by competent medical authority. And this melting-point is 40° C. or 104° F. Any higher melting-point can be easily obtained by incorporating with the petroleum ointment more or less *yellow wax*, and the exact consistence and melting-point of the product will, therefore, be more easily within the personal control of the pharmacist, than if he were compelled to rely upon the alleged melting-point of a manufactured product.

The addition of yellow wax to petroleum ointment has long been known to yield a perfectly homogeneous and satisfactory product. Nor does it introduce into the mixture any source of deterioration, at least for any reasonable period of time, since it has been shown that the mixture remains a long while free from all trace of rancidity, particularly if the petroleum ointment itself was sweet and fresh.

It has been said above, that pharmacists, as a rule, will probably prefer only *one* officinal petroleum ointment, and this supposition will probably be confirmed should any discussion of this paper take place after being read. But it is also approved by quite a number of physicians, with whom the subject has been discussed, and to whom the difficulties attending the recognition of several grades had been pointed out. But so far as the writer is aware, those who advocate the introduction of only *one* petroleum ointment, whether pharmacists or physicians, do not deny the correctness of the statement of the other side, that several grades of petroleum ointment, of different melting-points, are very desirable. They only wish to point out that the *official* recognition of more than *one* kind would by no means be a guarantee that the other products could even be at all times procured in the market when required, or would be furnished if ordered. And as it is certain that the pharmacist can furnish to the physician equally satisfactory products of *controllable* and *known* melting-points, if such are required, by the method above indicated, it is hoped that the two professions will come to the harmonious conclusion to recognize, in the forthcoming new Pharmacopœia, only one petroleum ointment, having a melting-point of 40° C. or 104° F.

II. CHEMISTRY.

COMMERCIAL PHOSPHATE OF SODIUM.*

BY PROFESSOR P. W. BEDFORD.

Query 27.—A report on the quality of phosphate of sodium as found in commerce.

When the above query was appended to the list last year, the writer had for the moment forgotten that our co-worker, Mr. George W. Kennedy, had given the results of a similar investigation in a paper read at the Pennsylvania Pharmaceutical Association, held in Allentown, June 8th and 9th, 1880. Desiring, therefore, that the results of his careful observation shall be brought to your notice, I give the practical results of his paper: He examined six specimens, representing samples of the several manufacturers in the country, and found that all contained large proportions of sulphate of sodium; two contained small quantities of carbonate of sodium, while only traces were present in the other samples; two contained traces of lime. The two latter materials may practically be disregarded, and the sulphate of sodium considered only as a commercial impurity that should not be present. Mr. Kennedy's results, so far as the percentage of sulphate of sodium present, may be stated as follows:

No. 1,	60 per cent.
" 2,	56 "
" 3,	51 "
" 4,	25 "
" 5,	35 "
" 6,	41 "

All the samples were free from arsenic, and the phosphoric acid present was the tribasic variety.

This examination is conclusive that none of the commercial varieties of phosphate of sodium can be regarded as of sufficient purity to use without recrystallization or purification. I have, during the past year, examined fourteen samples of phosphate of sodium as found in commerce, and my own experiments verify those already alluded to. The best sample examined contained 19.5 per cent., and the most objectionable contained 57.5 per cent. of sulphate of sodium.

Under these circumstances it seems very desirable that these facts should receive sufficient notoriety to place druggists more on their

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* Read at the Fifth Session.

guard in making preparations containing this salt. It should also receive attention in the characteristic tests appended to this article in the next revision of the Pharmacopœia.

SOLUBLE FERRIC PHOSPHATE.*

BY LOUIS DOHME.

When a solution of ferric sulphate is added to a solution of sodic phosphate, ferric phosphate ($FePO_4$) is thrown down as a bulky white precipitate, which, like precipitated ferric pyrophosphate ($Fe_4 3P_2O_5$), is slightly soluble in water, but, like it also, very soluble in a solution of citrate of sodium, forming a green solution, which, when evaporated to a syrupy consistence, then spread upon plates of glass and allowed to dry at a moderate temperature, forms beautiful transparent green scales which are quite soluble in water.

The following formula will yield good results:

Take of	Phosphate of sodium, ...	*sixty parts* (60).
	Solution of tersulphate of iron, .	*seventy parts* (70).
	Citric acid, ...	*fifteen parts* (15).
	Bicarbonate of sodium, . . .	*fourteen parts* (14).

Dissolve the phosphate of sodium *in three hundred parts* of water; filter the solution, and add to it gradually and under constant stirring, the solution of tersulphate of iron, previously mixed with three hundred parts of water. Pour the whole on a wet muslin strainer and allow the precipitate to drain; then return it to the vessel and mix intimately with *five hundred parts* of water. Again drain it on the strainer and repeat the operation once more. Dissolve the citric acid in *sixty parts* of water, and gradually add the bicarbonate of sodium. Heat the solution on a water-bath, and gradually add the precipitated ferric phosphate, stirring constantly till it is dissolved. Filter the solution and evaporate it on a water-bath to the consistence of thick syrup, and spread it on plates of glass, so that the salt, when dry, may be obtained in scales.

Characteristics.—Thin, green, transparent scales, having an acidulous, slightly saline taste; freely and wholly soluble in water, but insoluble in alcohol. Ferrocyanide of potassium, added to a dilute solution of the salt, produces a decided blue color, but no precipitate. When heated with solution of potassa in excess, a reddish-brown precipitate is formed. When this is separated and the colorless filtrate neutralized with nitric acid, *a light yellow* precipitate is formed on the addition of a solution of nitrate of silver and a few drops of water of

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* Read at the Fourth Session.

ammonia, which distinguishes it from pyrophosphate of iron, the latter affording, when treated in the same manner, *a white* precipitate. The scaled salt contains about 15 *per cent.* of iron.

This soluble ferric phosphate can also be prepared by simply mixing solutions of the officinal ferric citrate and pure sodic phosphate in equivalent proportions, evaporating to a syrupy consistence, and obtaining the salt in scales in the manner above stated, as follows:

Take of	Citrate of iron, . . .	*six parts* (6).
	Phosphate of sodium, . .	*seven parts* (7).
	Distilled water, . . .	*a sufficient quantity* (q. s.).

Dissolve the citrate of iron in twelve parts of water by heating on a water-bath. To this solution add the phosphate of sodium, and stir constantly till it is dissolved. Lastly, evaporate the solution at a temperature not exceeding 60° C (or 140° F.) to the consistence of thick syrup, and spread on plates of glass, so that the salt, when dry, may be obtained in scales.

The proportions chosen in the above formula and the probable results are explained in the following equation:

$$\begin{array}{cc} Fe_2(C_6H_5O_7)_26H_2O. & + \; 2Na_2HPO_4,12H_2O \\ 598 & 716 \\ \text{(6 parts)} & \text{(7 parts approximately)} \end{array}$$

equals

$$\begin{array}{ccc} 2(FePO_4) & + \; 2(Na_2HC_6H_5O_7) & + \; 6H_2O \; (+ \; 12H_2O \text{ lost}) \\ 302 & 472 & 108 \end{array}$$

Or, 882 parts of finished salt, containing 112 parts of iron (2 Fe), or 12.7 per cent., representing 34.2 per cent. of ferric phosphate. It will be noticed that the salt prepared by this formula, although identically the same in appearance, solubility, and other characteristics named in the description of the salt prepared by the first formula, differs from this by containing only 12.7 per cent. of iron instead of 15 per cent. If a salt containing about 15 per cent. of iron is desired, it would be necessary to increase the proportion of citrate of iron in the formula as follows:

Take of	Citrate of iron, . . .	*nine parts* (9).
	Phosphate of sodium, . .	seven parts (7).
	Distilled water, . . .	a sufficient quantity (q. s.).

Dissolve the citrate of iron in eighteen parts of water by heating on a water-bath. To this solution add the phosphate of iron, and stir constantly till it is dissolved. Lastly, evaporate the solution at a temperature not exceeding 60° C. (or 140° F.), to the consistence of thick syrup, and spread on plates of glass, so that the salt, when dry, may be obtained in scales.

$$\begin{array}{ccc} 3Fe_2(C_6H_5O_7)_2, & + \; 18H_2O & + \; 4Na_2HPO_412H_2O \\ & 1794 \text{ (9 parts)} & 1432 \text{ (7 parts)} \end{array}$$

equals

$$\begin{array}{cccc} 4FePO_4 & + \; Fe_2(C_6H_5O_7)_2 & + \; 4Na_2HC_6H_5O_7 & + \; 14H_2O \; (+ \; 16H_2O \text{ lost}) \\ 604 & 490 & 944 & 252 \end{array}$$

Or, 2290 parts of scaled salt, containing 336 parts of iron (6 Fe), equal to 14.66 per cent.

The scaled salt obtained by using the above proportions possesses the same characteristics enumerated in the description of the salt obtained by the first formula, but the equation shows that a part of the iron remains in combination with the citric acid, which, therapeutically considered, would scarcely be objectionable.

The advantage of making the soluble ferric phosphate by simply mixing solutions of citrate of iron and phosphate of sodium and evaporating, consists in the fact that a salt of a definite percentage of iron can thus be prepared, as no loss of either salt used in the formula can occur, and both have a definite composition, whilst in the first formula more or less of the precipitated phosphate of iron is lost, according to the extent of the washing of the precipitate, and the percentage of iron in the finished salt must consequently be variable in proportion to the precipitated phosphate lost during the washing.

ON THE MANUFACTURE OF MILK-SUGAR IN THE UNITED STATES.*

BY JOS. L. LEMBERGER, LEBANON, PA.

QUERY 10. Can milk-sugar be profitably prepared in this country?

ON examining the statistics of milk-sugar importations of recent years we find that it is becoming an article of considerably more importance commercially than in former years. The statistics for the last eight years read as follows:

For the fiscal year, ended June 30th,

1873,	$3,233.00
1874,	6,370.00
1875,	8,337.00
1876,	9.099.00
1877,	14,653.00
1878,	16,008 00
1879,	22,861.00
1880,	25,430 00

The above table shows an eight-fold increase in eight years. Prior to the first date given, returns of sugar of milk importation were not separately enumerated.

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* Read at the Third Session.

It is an interesting fact in this connection that American enterprise is at last taking hold of the matter, and milk-sugar is manufactured in this country. In the cheese and butter manufacturing districts the whey yielding milk-sugar is not considered, as formerly, valuable in stock-raising, and is, therefore, comparatively a waste product. The sample of milk-sugar herewith presented for examination was made at a cheese factory in Holland Patent in the State of New York, and whilst this factory is not in operation at this time, I believe they have demonstrated the fact that this product can be profitably manufactured; as a lack of capital to purchase improved vacuum pans and centrifugal machinery alone has retarded this part of their business, and I infer from intimation given that they expect to resume at an early day. I have the promise of a report in detail by the chemist in charge of this particular factory, but for some cause it has not been received; should it reach the writer in time for publication, and the committee deem it a proper paper, it may be added to this report.

Under a very recent date I learned of a factory in Little Falls, N. Y., where, among other milk products, they expect to supply milk-sugar. I could not procure a sample in time for this meeting. In view of the above facts, it is my judgment that milk-sugar can be profitably manufactured in this country, but only as a coproduct of milk, that is, it will not pay to consume the milk for the sake of the sugar only at the commercial value of thirty-five (35) cents per pound.

I think the day is not far distant when the increasing demand for this article for pharmaceutical purposes will be supplied by American manufacturers, and it will be classed among the numerous and varied industries of this great country.

Since the above was written Mr. G. Osann, chemist, Brooklyn, N. Y., who has had some experience in the manufacture of milk-sugar, kindly furnished the following:

"The operation, simple as it appears, is surrounded with some difficulties, among which are that of securing a rapid filtration of the liquid, and further on the utilizing of the mother-lye or residue of the first crystallization. The writer, however, would say with confidence that these and other obstacles can be overcome with larger capital and proper apparatus in the hands of an intelligent operator.

"My apparatus at Holland Patent consisted of three vats of about 450 gallons each capacity. The vats were constructed of wood and lined with tin, with a coil at the bottom of 1-inch pipe. They were arranged in shape of a terrace, so that the contents of the upper one could be drawn into the lower by siphon or faucet. The whey, when heated to 200° F., separates an enormous quantity of caseous matter, the dairymen using only what they call their first coagulation (at a much lower temperature). They all use rennet, mostly in substance, and no kind of acid, as stated in some papers. After coagulation in the first vat I allowed the liquid to settle, when it was drawn into the second vat, and condensed to about two-thirds of its bulk. Standing for about ten hours, or during a night, another sediment forms. From this the fluid is run into the third vat, and brought to the crystallization-point at about 185° F. During all those operations I used no filters, depending solely on the process of settling of the insoluble matter. I have condensed 140,000 pounds of whey, and obtained therefrom 2600 pounds of raw crystallized sugar, or a fraction over 1¾ per cent. I had to throw away all the mother-lyes except 100 pounds, which were carefully weighed and exhausted, yielding exactly the same amount of sugar; besides a quantity of rich liquid was allowed to run out of the vats with the coagulated matter.

"From this you will see that we cannot speak of a process proper or a working method laid down as a guide for others.

"Within my knowledge there is no practical literature treating on sugar of milk to any great extent. Of the quantity made I was able to refine only about 200 pounds so far. It is of a handsome and marketable quality, and the standard of purity equal to Swiss. (See Hager on Lactose.)

"The amount of lactate of iron in the raw sugar is rather small and easily removed. In refining I dissolved 1 part in 3½ parts boiling water, stirring the solution until cold.

"The wet sugar was then thrown into a centrifugal and freed from the dark liquid, and when again dissolved the solution filters readily through coarse paper or cloth. Whether a charcoal filter will be an advantage is an open question. To obtain a white sugar, or rather to make it equal to the Swiss, two or three solutions will be required."

III. MATERIA MEDICA.

CATALOGUE OF THE MEDICINAL FLORA OF THE STATE OF KANSAS.*

BY R. J. BROWN, LEAVENWORTH, KANSAS.

Climate and soil have much influence in determining what shall be the plants of a country. More than two hundred of the plants of Kansas are not found east of the Mississippi, and a large number com-

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* Presented at the Fifth Session.

mon east of the Alleghany Mountains are not found here. So far, but few of the plants in this section have been introduced as medicinal remedies. A number are in demand by the Indians and early pioneers for various diseases, but their medical properties are not well determined.

Owing to the warmth and dryness of the climate the non-flowering plants are rare; occasionally only a few species are found in shady places. Ferns, mosses, liverworts, and lichens are rarely met with.

Of the large order of Ericaceæ, which has, east of the Mississippi River, more than eighty species, including the huckleberry, cranberry, rhododendrons, etc., only two or three species have been found in the State. It is said they do not flourish where there is lime in the soil.

Of the Leguminosæ and Compositæ we have a great abundance. Of the trees, we lack all of the evergreens, except red cedar, and that is rare. We have no chestnut or beech, and only one birch in the southeast corner of the State. We have nearly all the oaks and hickories. We have no peat swamps, and lack plants peculiar to such places. Many plants never found on the prairies are common on the streets and old-settled places, such as plantain, burdock, stramonium, etc.

None of the salvias, menthas, and crotons of Materia Medica, are found in Kansas. We have others of the same genera, which, we think, are entitled to a place in our list.

We have used Gray's "Botany" in giving the order of the plants. As to localities we cannot always tell how extensively the plant is found.

We are indebted to botanists of the State for valuable aid, and to Professor J. H. Carruth, who has devoted a great deal of time to the botany of Kansas.

ACANTHACEÆ.

Dianthera Americana.	Water willow.

Rare. Found in Douglas and Coffee counties.

ALISMACEÆ.

Alisma plantago.	Water plantain.
Sagittaria variabilis.	Arrow head.

Common in the State.

AMARANTACEÆ.

Amarantus albus.	Pig weed or tumble weed.
Amarantus blitum.	Wild amaranth.

Abundant in west part of State.

AMARYLLIDACEÆ.

Hypoxis erecta.	Star-grass.

Common on the prairies.

ANACARDIACEÆ.

Rhus glabra.	Smooth sumach.

Abundant in Eastern Kansas.

Rhus radicans.	Climbing ivy.
Rhus toxicodendron.	Bush or poison ivy.
Rhus aromatica.	Sweet sumach.
Rhus copallina.	Dwarf sumach.

Abundant in the valleys and limestone ledges.

APOCYNACEÆ.

Apocynum cannabinum.	Indian hemp.

Common in the State.

AQUIFOLIACEÆ.

Ilex decidua.	Deciduous holly.

ARACEÆ.

Arisæma dracontium.	Green dragon.
Arisæma triphyllum.	Indian turnip.
Acorus calamus.	Sweet flag.

Rare in the State.

ARISTOLOCHIACEÆ.

Aristolochia sipho.	Dutchman's pipe.
Asarum canadense.	Wild ginger.

Rare. Found in Johnston, Linn, and Cherokee counties.

ASCLEPIADACEÆ.

Asclepias incarnata.	Swamp milk-weed.
Asclepias cornuti.	Common milk-weed.
Asclepias tuberosa.	Butterfly weed.
Asclepias verticillata.	Whorled milk-weed.

All of above common in eastern part of State.

BERBERIDACEÆ.

Podophyllum peltatum.	Mandrake.

This plant follows civilization. First seen in the State in 1860, and is quite well scattered over the eastern part of the State.

BETULACEÆ.

Betula nigra.	Red birch.

Rare. Found in Cherokee County.

BORRAGINACEÆ.

Cynoglossum officinale.	Hounds tongue.
Cynoglossum Morrisoni.	Beggar's ticks.
Lithospermum arvense.	Stone seed.

Found in various parts of the State. Rare.

CACTACEÆ.

Opuntia vulgaris.	Prickly pear cactus.

Rare. Found in Douglas County.

CALLITRICHACEÆ.

Callitriche verna.	Water star-wort.

CAPPARIDACEÆ.

Gynandropsis pentaphylla.	Spider flower.
Polanisia graveolens.	Wormweed.

Rare.

CAPRIFOLIACEÆ.

Sambucus canadensis.	Elder.

Very abundant in the State.

Symphoricarpus occidentalis.	Wolf berry.
Symphoricarpus vulgaris.	Indian currant.
Triosteum perfoliatum.	Fever root.

Common in eastern part of the State.

CARYOPHYLLACEÆ.

Mollugo verticillata.	Carpet weed.
Saponaria officinalis.	Soap-wort or Bouncing bet.

Rare in the State.

CELASTRACEÆ.

Celastrus scandens.	False bittersweet.
Euonymus atropurpureus.	Wahoo.

Found in various parts of the State. Not abundant.

CERATOPHYLLACEÆ.

Ceratophyllum demersum.	Horn-wort.

Rare in the State.

CHENOPODIACEÆ.

Chenopodium album.	Lamb's quarters.
Chenopodium ambrosioides.	Mexican tea.
Chenopodium anthelminticum.	Wormseed.
Chenopodium botrys.	Jerusalem oak.

Abounds generally on waste grounds in the State.

CISTACEÆ.

Lechea majar.	Pin weed.

Rare. Found only in Cherokee County.

COMMELYNACEÆ.

Commelyna Virginica.	Day flower.
Tradescantia Virginica.	Spider-wort.

Common in eastern part of the State.

COMPOSITÆ.

Achillea millefolium.	Yarrow.

Very abundant

Ambrosia artemisiæfolia.	Roman wormwood.
Ambrosia trifida	Horse weed.

Common in eastern part of the State.

Antennaria plantaginifolia.	Mouse ear.
Common early in the spring.	
Artemisia vulgaris.	Mugwort.
Artemisia ludoviciana.	Western mugwort.
Aster puniceus.	Red-stalked aster.
Aster Tradescanti.	Michaelmas daisy.
Bidens bipinnata.	Spanish needles.
Bidens connata.	Cuckola.
Bidens frondosa.	Beggar's ticks.
Common, and found in south part of State.	
Cacalia atriplicifolia.	Wild caraway.
Cacalia tuberosa	Indian plantain.
Very abundant.	
Cirsium arvense.	Canada thistle.
Rare. Found in Douglass and Shawnee counties.	
Erechthites hieracifolius.	Fire-weed.
Rare.	
Erigeron canadensis.	Canada fleabane.
Abundant.	
Erigeron Philadelphicum.	Phila. fleabane.
Rare.	
Eupatorium ageratoides.	White sanicle.
Eupatorium perfoliatum.	Boneset.
Eupatorium purpureum.	Queen of the meadow.
Rare. Few plants only found.	
Gnaphalium polycephalum.	White balsam.
Rare.	
Grindelia squarrosa	Snake-head grindelia.
Rare. In Douglass County and Leavenworth County.	
Helenium autumnale.	Sneezewort.
Helianthus orgyalis.	Sunflower.
Helianthus tuberosus.	Jerusalem artichoke.
Kuhnia eupatorioides.	False boneset.
Lactuca elongata.	Trumpet milk-weed.
Lappa major.	Burdock.
Made its appearance on the highways about 1865.	
Liatris cylindracea.	Species of button snake-root.
Liatris scariosa.	Gay feathers.
Liatris spicata.	Button snake-root.
Found in southern part of the State.	
Liatris squarrosa.	Blazing star.
Common all over the State.	
Maruta cotula.	Mayweed.
Common in towns and cities.	
Mulgedium acuminatum.	Blue lettuce.
Polymnia canadensis.	Leaf cup.
Polymnia uvedalia.	Bear's foot.
In Labette and Miami counties.	
Rudbeckia lacinata.	Cone flowers.
Rare.	
Senecio aureus.	Golden rag-wort.
Silphium laciniatum.	Resin weed.
Silphium perfoliatum.	Cup plant.
Very abundant in all parts of the State.	

Solidago gigantea.	Smooth 3-ribbed golden rod.
Solidago rigida.	Hard-leaved golden rod.

Abundant in eastern part of the State

Sonchus oleraceus.	Sow thistle.

Rare. Occasionally found.

Taraxacum dens-leonis.	Dandelion.

In cultivated places. Introduced about 1860.

Verbesina sinuata.	Crown beard.
Verbesina Virginica.	Crown beard.

In Ellis and Labette counties Rare.

Vernonia fasciculata.	Iron weed.

Very abundant on roadsides and fields.

Xanthium spinosum.	Thorny clot-weed.
Xanthium strumarium.	Common clot-weed.

Abundant on roadsides, Eastern Kansas.

CONIFERÆ

Juniperus Virginiana.	Red cedar.

Rare. Found only in Anderson County, and west.

CONVOLVULACEÆ.

Calystegia sepium.	Rutland beauty.

Common in eastern part of the State.

Convolvulus arvensis.	Bind weed.

Rare.

Ipomœa nil.	Blue morning glory.
Ipomœa purpurea.	Purple morning glory.

Abundant.

Ipomœa pandurata.	Wild potato.

Rare.

CORNACEÆ.

Cornus florida.	Flowering dogwood.

Rare in Cherokee County.

Cornus paniculata.	White cornel dogwood.

Common in Eastern Kansas.

CRASSULACEÆ.

Penthorum sedoides.	Stonecrop.

In East and West Kansas. Rare.

CRUCIFERÆ.

Arabis canadensis.	Sickle pod.
Capsella bursa-pastoris.	Shepherd's purse.

Found in Eastern Kansas, not abundant.

Cardamine rhomboidea.	Spring cress.
Erysimum cheiranthoides.	Treacle mustard.

Marshall County. Rare.

Lepidium Virginicum.	Wild pepper grass.

Very common.

Nasturtium officinale.	Water cress.

In Douglass and Davis counties, rare.

Sinapis nigra.	Black mustard.

Rare. In Leavenworth County.

Sisymbrium officinale. Hedge mustard.

Very common, East Kansas.

CUCURBITACEÆ.

Sicyos angulatus. Single seed cucumber.

Occasionally found in Eastern Kansas.

CUPULIFERÆ

Corylus Americana. Hazelnut.

Abundant in Eastern Kansas.

Ostrya Virginica. Iron wood.

Rare. Leavenworth, Atchison, and Douglass counties.

Quercus alba. White oak.

Rare. Eastern Kansas.

Quercus aquatica. Water oak.

Southeastern Kansas. Rare.

Quercus coccinea. Scarlet oak.

Eastern Kansas. Common.

Quercus falcata. Spanish oak.

Douglass County. Rare.

Quercus macrocarpa Burr oak.

Eastern Kansas, very common.

Quercus nigra. Black Jack.

Eastern Kansas, very common.

Quercus obtusiloba. Iron oak.

East and Southeast Kansas. Common.

Quercus rubra. Red oak.

Very common.

Quercus palustris. Pin oak.
Quercus prinus. Chestnut oak.
Quercus tinctoria. Black oak.

Eastern Kansas, very common. We have four or five more oaks.

CYPERACEÆ.

Scirpus lacustris. Bulrush.

Rare.

DIOSCOREACEÆ.

Dioscorea villosa. Wild yam.

Miami County, rare.

EBENACEÆ.

Diospyros Virginiana. Persimmon.

Common in Leavenworth County.

EQUISETACEÆ.

Equisetum arvense. Horse-tail rush.
Equisetum hyemale. Scouring rush.
Equisetum robustum. Tail branching rush.

Eastern part of the State, common.

ERICACEÆ.

Monotropa uniflora. Ice plant.

Rare. Douglass County.

EUPHORBIACEÆ.

Euphorbia corollata.	Flowering spurge.
Euphorbia hypericifolia.	Large spotted spurge.
Euphorbia maculata.	Spotted spurge.
Euphorbia prostrata.	Swallow-wort.

All common in the State.

Acalypha Virginiana.	Mercury weed.

Common.

Croton capitatum.	Croton.
Croton monanthogynum.	Croton.

Abundant in fields and roadsides.

FILICES.

Adiantum pedatum.	Maiden hair.
Botrychium lunarioides.	Rattlesnake fern.
Polypodium incanum.	Rock brake.

Very rare. Only occasionally found.

FUMARIACEÆ.

Dicentra cucullaria.	Dutchman's breeches.

Rare.

GENTIANACEÆ.

Gentiana saponaria.	Soap-wort gentian.

Rare.

Sabbatia campestris.	Species of American centaury.

GERANIACEÆ.

Geranium maculatum.	Cranesbill.
Geranium Carolinianum.	Cranesbill.

Rare. Leavenworth and Johnston counties.

Impatiens fulva.	Touch-me-not.
Impatiens pallida.	Jewel weed.

Eastern Kansas. Rare.

Oxalis violacea.	Wood sorrel.

Abundant.

GRAMINEÆ.

Bromus ciliatus.	Brome grass.
Bromus secalinus.	Chess grass.

HÆMODORACEÆ.

Lachnanthes tinctoria.	Red root.

Labette County. Rare.

HYDROPHYLLACEÆ.

Hydrophyllum Virginicum.	Bur flower.

Found in low wet places.

HYPERICACEÆ.

Hypericum perfoliatum.	St. John's wort.
Hypericum sarothra.	Orange grass.

Labette County. Rare.

IRIDACEÆ.

Sisyrinchium Bermudianum.	Blue-eyed grass.

Common in the State.

JUGLANDACEÆ.

Carya alba.	Shag bark.
Carya amara.	Bitternut.
Carya olivæformis.	Pecan.
Carya sulcata.	Shellbark.
Juglans nigra.	Black walnut.

Above are common in East and South Kansas.

LABIATÆ.

Blephilia hirsuta.	Ohio horsemint.
Brunella vulgaris.	Self heal.

Common in eastern part of the State.

Hedeoma pulegioides.	Pennyroyal.
Leonurus cardiaca.	Motherwort.

Both above in Douglass County. Rare.

Lycopus Europæus.	Water hoarhound.
Lycopus Virginicus.	Bugle weed.

Specimens found in Leavenworth and Linn counties.

Marrubium vulgaris.	Horehound.

Rare.

Mentha viridis.	Spearmint.

Cultivated in gardens.

Mentha canadensis.	Wild mint.

Abundant in Leavenworth County.

Monarda fistulosa.	Wild bergamot.
Monarda punctata.	Horsemint.

Rare.

Nepeta cataria.	Catnip.

Introduced. Not growing wild.

Nepeta glechoma.	Ground ivy.
Pycnanthemum linifolium	Flaxseed.
Salvia Pitcheri.	Wild sage.
Salvia lanceolata.	Forking sage.

Abundant on the prairies and roadsides.

Scutellaria lateriflora.	Scull cap.

Marshall and Miami County. Rare.

Stachys palustris.	Clown head.

In wet places.

Teucrium canadensis.	Germander.

Common in the State.

LAURACEÆ.

Lindera benzoin.	Spice wood.
Sassafras officinale.	Sassafras.

Cherokee County. Very rare.

LEGUMINOSÆ.

Amorpha canescens.	Lead plant.

Common on the prairies.

Apios tuberosa.	Groundnut.	Rare.
Astragalus caryocarpus.	Ground plum.	Common in all parts of the State.
Baptisia australis.	Wild indigo.	Abundant in northern part of the State.
Cassia chamæcrista.	Prairie senna.	Abundant.
Cassia marilandica.	American senna.	Not abundant.
Cercis canadensis.	Red bud.	Common in valleys.
Gleditschia triacanthos.	Honey locust.	
Gymnocladus canadensis.	Coffee bean.	Not very abundant.
Medicago sativa.	Lucerne alfulfa.	Rare.
Psoralea esculenta.	Bread root.	East and West Kansas. Rare.
Robinia pseudacacia.	Common locust.	Introduced. Destroyed by the borers.
Schrankia uncinata.	Sensitive brier.	Abundant on prairies.
Tephrosia Virginiana.	Goat's rue, catgut.	In sandy places. Rare.
Trifolium pratense.	Red clover.	Introduced in the State. Not abundant.
Trifolium repens.	White clover.	Introduced. Becoming abundant.
Trifolium reflexum.	Buffalo clover.	Native. Fast disappearing.

LEMNACEÆ.

Lemna minor.	Duck-meat.	Rare.

LILIACEÆ.

Allium canadensis.	Meadow garlic.	In Douglass County. Rare.
Melanthium Virginicum.	Bunch flowers.	In wet places. Not abundant.
Polygonatum multiflorum.	Solomon's seal	
Smilacina racemosa.	Small Solomon's seal.	In Leavenworth County. Rare.
Scilla Traveri.	Wild hyacinth.	Common in the State.

LOBELIACEÆ.

Lobelia cardinalis.	Cardinal flowers.	
Lobelia inflata.	Lobelia. Indian tobacco.	Rare.
Lobelia syphilitica.	Blue lobelia.	Eastern and Northern Kansas. Common.

LORANTHACEÆ.

Phorodendron flavescens.	Mistletoe.	In Labette County. Rare.

LYTHRACEÆ.

Cuphea viscosissima.	Wax bush.	In Miami County. Rare.
Lythrum alatum.	Loosestrife, milk willow.	Common in wet places.

MALVACEÆ.

Hibiscus Trionum.	Flower of an hour.	Introduced as flower plant. Now growing wild.
Malva sylvestris.	Common mallow.	Grown in gardens.
Abutilon Avicennæ.	Velvet leaf.	Common on roadsides.
Sida spinosa.	Indian mallow.	Common.

MENISPERMACEÆ.

Menispermum canadenses.	Moonseed.	Very abundant.
Cocculus carolinianus.	Cocculus.	Labette County. Rare.

NAIADACEÆ.

Najas flexilis.	Water nymph.	

NYMPHÆACEÆ.

Brasenia peltata.	Water shield.	
Nelumbium luteum.	Water chinquapins.	Eastern Kansas. Rare.
Nuphar advena.	Yellow pond lily.	
Nymphæa odorata.	White pond lily.	Somewhat abundant.

OLEACEÆ.

Fraxinus Americana.	White ash.	
Fraxinus pubescens.	Red ash.	
Fraxinus quadrangulata.	Blue ash.	Not very common in the State.

ONAGRACEÆ.

Circæa lutetiana.	Enchanter's night shade.	
Ludwigia alternifolia.	Seed box.	Eastern Kansas. Rare.
Œnothera biennis.	Evening primrose.	Very abundant.

PAPAVERACEÆ.

Argemone Mexicana.	Prickly Poppy.	Cultivated in gardens.

PHYTOLACCACEÆ.

Phytolacca decandra.	Poke.

Abundant in Eastern Kansas.

PLANTAGINACEÆ.

Plantago lanceolata.	Snake plantain.
Plantago major.	Common plantain.
Plantago Virginica.	White plantain.

Common.

PLATANACEÆ.

Platanus occidentalis.	Button ball.

Abundant in eastern part of the State.

POLYGALACEÆ.

Polygala senega.	Senega root.

Abundant in Decatur County.

POLYGONACEÆ.

Polygonum amphibium.	Water persicaris.
Polygonum aviculare.	Knot grass.

Quite common on prairies.

Polygonum convolvulus.	Climbing buckwheat.
Polygonum hydropiper.	Water pepper.
Polygonum hydropiperoides.	Mild water pepper.
Polygonum persicaria.	Heartsease.
Polygonum acre.	Smart-weed.
Polygonum Virginianum.	Virginia bistut.

All of above in fair abundance.

Rumex hydrolapathum.	Water dock.
Rumex crispus.	Burdock.

Introduced or naturalized.

Rumex verticillatus.	Water dock.
Rumex sanguineus.	Red-veined dock.

Above occasionally found. Not common.

PORTULACEÆ.

Portulaca oleracea.	Purslane.

In fields and gardens.

PRIMULACEÆ.

Anagallis arvensis.	Pimpernel

Rare in Miami County.

Dodecatheon Meadia.	Shooting star.

Cherokee County. Rare.

RANUNCULACEÆ.

Anemone cylindrica.	Indian anemone.
Anemone Virginiana.	Wind bloom.
Aquilegia canadensis.	Columbine.
Clematis viorna.	Leather flower.
Clematis Virginiana.	Virgin's bower.

Ranunculus abortivus.	Chicken pepper.
Thalictrum anemonoides.	Rue anemone.

Occasionally found in the eastern part of Kansas. Some of this order quite common.

RHAMNACEÆ.

Ceanothus Americanus.	Jersey tea.
Ceanothus ovalis.	Narrow-leaved red root.

Common on prairies.

Rhamnus lanceolatus.	Buckthorn.

Abundant.

ROSACEÆ.

Agrimonia eupatoria.	Agrimony.

Somewhat common.

Cratægus coccinea.	Hawthorn.

In Labette and Davis counties. Rare.

Cratægus oxyacantha.	English hawthorn.

Labette County. Rare.

Geum Virginianum.	White avens.

Common in Eastern Kansas.

Potentilla canadensis.	Five finger.

Not very common.

Potentilla Norvegica.	Norway cinquefoil.

Common.

Rosa blanda.	Prairie wild rose.

Common. East and West Kansas.

Rubus canadensis.	Dewberry.
Rubus occidentalis.	Black raspberry.
Rubus villosus.	Blackberry.

Eastern Kansas. Not abundant.

RUBIACEÆ.

Cephalanthus occidentalis.	Button bush.

Common.

Galium aparine.	Cleavers.
Galium circæzans.	Wild licorice.
Galium tinctorium.	Dyer's cleavers.
Galium trifidum.	Small cleavers.

Found in the State generally. Not common.

RUTACEÆ.

Ptelea trifoliata.	Wafer ash.

Anderson and Washington counties. Rare.

Xanthoxylum Americanum.	Prickly ash.

Common in the State.

SALICACEÆ.

Salix nigra.	Black willow.

Common in Eastern Kansas.

Populus angulata.	Cottonwood.

Quite common in the streams.

SANTALACEÆ.

Comandra umbellata.	Bastard toad flax.
In eastern part of the State. Rare.	

SAPINDACEÆ.

Acer dasycarpum.	White maple.
Acer saccharinum.	Sugar maple.
Æsculus glabra.	Buckeye.
Negundo aceroides.	Box elder.
Sapindus marginatus.	Soapberry.
All excepting soapberry abundant in the State.	

SCROPHULARIACEÆ.

Linaria vulgaris.	Toad flax.
Formerly cultivated in gardens, now wild.	
Pedicularis canadensis.	Lousewort.
Leavenworth County. Rare.	
Pentstemon pubescens.	Beards tongue.
Atchison County. Not common.	
Verbascum thapsus.	Mullein.
Naturalized. Now quite common.	
Verbascum blattaria.	Moth mullein.
Douglass and Franklin counties. Rare.	
Veronica Virginica.	Leptandra, Culver's physic.
Leavenworth County. Rare.	
Veronica peregrina.	Speedwell.
Not abundant.	

SMILACEÆ.

Smilax peduncularis.	Tall carrion flower.
Leavenworth County. Rare.	
Smilax pseudo-china.	American China-root.
Northeastern counties. Rare.	
Smilax rotundifolia.	Common green brier.
Abundant in the State.	

SOLANACEÆ.

Datura stramonium.	Thorn apple.
Abundant in towns and cities.	
Datura tatula.	Purple stramonium.
Abundant in waste places.	
Physalis viscosa.	Ground cherry.
Eastern counties. Common.	
Solanum carolinense.	Horse nettle.
Solanum nigrum.	Black nightshade.
Common in the State.	

TILIACEÆ.

Tilia Americana.	Linden.
Leavenworth County. Rare.	

TYPHACEÆ.

Typha latifolia.	Cat tails.
Common in wet places.	

UMBELLIFERÆ.

Æthusa cynapium.	Small hemlock.	
Cicuta maculata.	Water hemlock.	Eastern part of State. Not common.
Eryngium yuccæfolium.	Rattlesnake master.	Common on the prairies.
Pastinaca sativa.	Parsnip.	Not common.
Sanicula canadensis.	American sanicle.	Atchison, Leavenworth counties. Rare.
Sanicula marilandica.	Sanicle.	Rare.
Thapsium aureum.	Golden Alexanders.	Common.

URTICACEÆ.

Cannabis sativa.	Hemp.	Cultivated.
Celtis occidentalis.	Hackberry.	Leavenworth County. Common.
Humulus lupulus.	Hop.	Eastern counties. Common.
Laportea canadensis.	Canada nettle.	Abundant.
Morus rubra.	Red mulberry.	Eastern counties. Scattered.
Parietaria Pennsylvanica.	Pellitory.	Not common.
Pilea pumila.	Rich weed.	Common.
Ulmus Americana.	White elm.	Common in eastern part of the State.
Ulmus fulva.	Slippery elm.	
Urtica dioica.	Common nettle.	Very abundant.
Urtica urens.	Dwarf nettle.	Common.

VERBENACEÆ.

Verbena hastata.	American vervain.	Common in the State.
Verbena spuria.	Blue vervain.	
Verbena urticæfolia.	White vervain.	

VIOLACEÆ.

Viola cucullata.	Hooded violet.	Common.

VITACEÆ.

Ampelopsis quinquefolia.	Virginia creeper.	Common.

THE SENEGA OF COMMERCE.*

BY J. U. AND C. G. LLOYD.

The species of polygala that should yield senega, and which is officinal, is Polygala senega, Linn. The localities referred to by the authors of our dispensatories. and other writers. are the Southern and Western States. Such States of the South and West as furnish senega for the market, and which fact is personally known to us, are Kentucky, Virginia, Tennessee, North Carolina, Arkansas, Missouri, Ohio. Indiana, and Illinois. Doubtless small amounts of senega are also derived from the northern portions of other Southern States, and from portions of certain Northern and Eastern States that border the States we have named. In fact the typical species (Polygala senega, Linn.) is most common in the Eastern States, and the root of this agrees in appearance and characteristics with senega of the South and West. (We call attention to the plant in our herbarium from Vermont.) It has been uniformly the case that all lots of senega examined by ourselves, and which came direct from diggers or first hands from the States mentioned, agree with the accepted descriptions. In connection with the history of this drug we have made it an object, during the past few years, to consult brokers and dealers in indigenous drugs throughout the portions of our country that we have named. Their reports confirm, without exception, the above. such senega being known by drug brokers as "Southern senega." In connection with this part of our subject we beg leave to call attention to the specimen of Polygala senega, var. latifolia, Linn., of our herbarium, which was collected in Kentucky by ourselves, and about twenty-five miles south of Cincinnati. This we know to yield a root identical with the officinal, and about the same in size, and is

Southern Senega.—Senega from all the senega-producing States that we have named agrees in appearance, and, as the bulk of it is derived from States south of the Ohio River, the term "Southern senega" has been accepted as applicable to the drug that answers the description authorities accept as officinal senega. The States of Ohio, Indiana, and Illinois were once Western States. Since, the *West* has moved far beyond, and thus it is that even in Cincinnati, once a Western city, the senega which is derived from these States is called by dealers "Southern senega." This senega reaches our city (Cincinnati) in parcels of from a few pounds to bales of one or two hundred pounds. It comes from country stores and direct from the gatherer. Some-

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* Read at the Fifth Session.

times it is nice and clean, again it is scarcely washed at all, and frequently is gathered with the top attached, and in this manner sent to market. Owing to the high price it is not so liable to admixtures as cheaper roots, but it is not unusual to find other of our indigenous roots mixed with it. There have been several articles written upon this subject in our journals at home and abroad, so that it is not necessary for us to dwell upon this phase of the question, other than to say that we believe the larger share of these admixtures to result from carelessness with the digger rather than from any intention to adulterate. In concluding our remarks upon Southern senega, we call attention to the specimens which accompany, derived as follows: Nos. 1 and 2 from Kentucky, and No. 3 from Indiana.

Northern Senega.—Let us bear in mind that the original senega-root, and all that was used until about ten years ago, was derived from the sections of country that we have named.* To produce it the typical species—Polygala senega, Linn., and Polygala senega, var. latifolia—are gathered indiscriminately. Until a few years ago there was no reason for a division of the senegas of commerce. Now, however, dealers in senega speak of "Northern senega," the distinction being brought about by the appearance in market of a root unlike the original, such being derived from the Northwest, about the forty-fourth degree of latitude, and from the States of Wisconsin and Minnesota. The first consignments of this senega that we have been able to trace were noted about ten years ago. It is very large, sometimes white, again rather dark brown. The knot at the top of the root, from which sprung the stems, is often two or three inches in diameter, even of the dried plant. The root just below the knotty head is (when dry) from the size of the little finger to that of the thumb of a man. It is from six to ten inches in length, and generally destitute of the keel-like ridge which is so marked a characteristic of Southern senega. The root of this Northwestern variety is not so contorted and branched as that of the Southern senega, being large and fleshy. It has the relationship appearance, however, of the polygalas, the odor and taste of senega, and occasionally (the exception) more or less of the keel-like ridge. The first notice that we can find in print regarding this senega is that of Mr. William Saunders in the "Proceedings of the American Pharmaceutical Association," 1876. Since that day the drug has become familiar in the market, commanding about five cents less per pound than the Southern senega. It has been examined microscopically by Mr. Thomas Greenish ("Am. Journ.

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* The typical Polygala senega, Linn., is native to the Eastern portions of the United States; however, it does not seem to be in abundance sufficient to repay gathering.

Pharm.," 1878) and by Mr. George Gœbel, Jr. (" Am. Journ. Pharm.," 1881).* Professor J. M. Maisch has been interested in this large senega for some years, and once traced a lot of it to Missouri. We have known of one lot that came from St. Louis, Mo., but we question very much if it grew in that State. Doubtless. it came *via* St. Louis from its home in the Northwest.

In connection with the history of this drug, we may say that while its origin has been a matter of doubt, and all endeavors to locate it botanically have heretofore failed, we are convinced that dealers have had no reason to preserve silence or secrecy other than for the protection of their interests as tradesmen. It seems to us, however, that the uncertainty regarding the drug has so acted as to unsettle the price, for it has ever been a questionable root, and many persons refused to accept it. Last winter Mr. W. W. Moser, of Cincinnati, offered to procure for us the entire plant when in season. Mr. Moser is an extensive dealer in indigenous medicinal plants, and has been in the business for twenty-five years or more, and handles considerable quantities of Northern and of Southern senega. According to promise, Mr. Moser procured from parties that gather the Northern senega (either in Wisconsin or in Minnesota) a specimen of the plant, and we present it (specimen No. 7). It will be noticed that the root of this one plant is larger in size than the average of Southern senega, but smaller than the average of the Northern senega. The keel-like ridge exists only for a short distance from the top, and the general appearance of the root is that of the Northern senega of commerce. We call attention now to the plant with root attached, which is fresh from one of the localities which supplies the large senega of commerce. This specimen was furnished us by Messrs. Huber & Co., of Fond du Lac, Wis., a firm that is known over our entire country for its dealings in indigenous drugs. They are first hands for Northern senega, in which they have an extensive trade, therefore the genuineness of these specimens cannot be questioned. The letter which we hold from Mr. Huber is of interest in connection with the habit of this senega, and the past and future history of the drug. It was written in reply to one we wrote asking for information on these points, and we present it to the Association with Mr. Huber's permission:

"DEAR SIR: In answer to your favor of the 10th instant, would say that senega in our State is already scarce, and will in a few years become nearly extinct. The

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* We take it for granted that the senega these gentlemen examined was the "Northern," as it is the only senega that we are acquainted with that answers the description they give and which is obtainable on the market. Mr. Gœbel, it is true, speaks of it as "Southern senega," but we think this simply a confusion of terms, and that the drug was likely the regular Northern senega.

advance of civilization and the introduction of domestic animals is rapidly exterminating many of our indigenous medicinal plants of our native forests and open prairies, among which senega is one of the most important. Our shipments this year will not exceed ten tons. It inhabits or grows on high rolling prairies or open timber. We have not found it in forests nor in swamps. We have made several attempts to cultivate it. We have a few plants growing, but, on the whole, we met with but little success. We are, however, of the opinion that it could be cultivated if the habits of the plant and the natural laws that govern its growth were thoroughly understood."

Both this and the plant obtained from Mr. Moser are Polygala senega, Linn., of a variety that seems to be intermediate between the typical species (Polygala senega, Linn.) and the Polygala senega, var. latifolia. It has narrower leaves than the variety native to the South (see specimen from Kentucky of Polygala senega, var. latifolia, in our herbarium), but the leaves are not so narrow as those of the typical form of the plant, a specimen from Vermont of which can also be seen in the herbarium. It agrees exactly with a specimen in our herbarium, to which we call attention, derived from Chicago, and which is also intermediate between the typical species of Polygala senega and the var. latifolia.*

Thus it follows that the plant which has created such a disturbance is, botanically, the officinal senega. The rich black soil and the climate of portions of those Northwestern States seem to be so well adapted to this plant that it grows luxuriantly, and so as to far exceed in size anything we have ever before known from any species of Polygala of our country, and to somewhat alter its appearance and the internal structure of the root. This fact has led us to question the authenticity of the drug, to think that perhaps the large senega was derived from some other species of Polygala, or even from another genus.†

Remarks. — This Northern senega is known as "false senega," "white senega," and in one or two instances has been called "Southern senega." Regarding these points we find that, as it is derived from the officinal species, it is *not* "false senega." The term "white senega" is not appropriate, for it is often dark brown (see specimen 6), and in color it does not differ more than other senegas of the mar-

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* We invite attention to the lots of senega-root which we present, and which were obtained direct from the States of Minnesota and Wisconsin.

† We have planted specimens of this Northern senega, and shall endeavor to cultivate the same in localities that furnish the Southern senega, to find if the size of the root is simply due to the influence of soil and climate. It may be that the plant does not differ enough from the typical species and the var. latifolia to induce botanists to recognize it as a distinct variety, but that the unusually large size of the root is permanent and will be preserved even in other than its native situations.

ket, as can be seen by referring to the two lots of senega we present from Kentucky. The expression "Southern senega" is not admissible, for it does not come from the South, and, on the contrary, the most of the regular senega of olden time *was* from the South. Undoubtedly, therefore, the large senega will continue to be known by dealers as *Northern senega* or as *large senega.*

Since the foregoing was written, Professor Maisch contributed an article ("Am. Journ. Pharm.," August, 1881, p. 387) on a specimen of senega which he obtained from Alabama, and which he thought likely might furnish the large senega of commerce. This Southern species, the Polygala Boykinii, Nutt., is the only native species that, to our knowledge, approaches in size the Polygala senega, Linn. We exhibit it in our herbarium, and by a comparison with the other species this fact becomes apparent. However, we do not think that it is gathered for market unless the root, as a rule, resembles the officinal senega. We are convinced that it never passes through the hands of Cincinnati dealers, for all "Southern senega" is of the form we present and have described.

REACTION BETWEEN TINCTURA FERRI CHLORIDI AND TINCTURA GENTIANÆ COMPOSITA.*

BY EDGAR L. PATCH.

QUERY 13.—The presence or absence of tannin in the root of Gentiana lutea. The statements on this subject are conflicting.

At the pharmaceutical meeting of the Massachusetts College of Pharmacy, held December 8th, 1875, Professor Bolles asked the cause of the reaction taking place upon mixing the tinctura ferri chloridi with tinctura gentianæ composita, a black, inky color being produced, although the textbooks at that date did not give tannic acid as a constituent of either the gentian root, the bitter orange-peel, or the cardamom-seeds, entering into the compound tincture of gentian. I agreed at that time to look the matter up and report at a subsequent meeting. Accepting the statement of Professor Bolles as to the position assumed by the textbooks, I thought to submit each ingredient of the compound tincture of gentian to examination in turn.

Gentian being the principal constituent, I naturally started with that. Occupied with the care of an extensive prescription business, and perplexed by various misfortunes I was suffering from, I realized that my

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* Read at the Third Session.

work must be confined to as narrow a channel as was consistent with any usefulness, and sought, by inquiry and study, to ascertain the best quantitative test for tannic acid. Many favoring a standard solution of gelatin, I adopted that. "Gmelin's Handbook," vol. xv, p. 452, furnishing the statement that the purest forms of tannin are found in the white, inner portion of the bark, lying next to the alburnum. To ascertain if this was true of gentian, I secured some whole root, and carefully removed the outer and then the inner bark. I made tinctures (℥ij to Oj) from both the inner and outer bark. I also made infusions of the same (℥ss to Oj). Each of the preparations was mixed with the Tr. Fe_2Cl_6. The tinctures gave the same distinctive reaction as tinctura gentianæ composita. The infusions gave very little reaction. My solution of gelatin consisted of ℈ij of Cox's gelatin, gr. xv of powdered alum, and Oj of water.

As the result of six experimental precipitations of a standard solution of tannin, confirmed by washing, drying, and weighing the precipitate, I concluded that one grain of gelatin precipitated one grain of the tannin employed. Exhausting a troy ounce of gentian root successively with five portions of boiling water until five pints of decoction were obtained, I evaporated this to eight fluid ounces.

I divided this concentrated decoction into four portions of one fluid ounce each, and one portion of four fluid ounces. As the result of precipitation with the gelatin solution, I obtained five grains of washed and dried precipitate from each of the ounce portions and twenty-one grains from the four-ounce portion.

Assuming this precipitate to be tannate of gelatin, it would represent twenty and one-half grains of tannin, or over four per cent., which, in view of the fact that gentian was stated to contain no tannin, seemed ridiculous.

Consulting several credited with much better knowledge of such matters than myself, I sought to ascertain what bodies, aside from tannin, gave a precipitate with gelatin. Failing to obtain any satisfaction in this direction, I instituted the following experiment:

Four troy ounces of powdered gentian root, previously moistened with water, was macerated for twenty-four hours in a pint of washed ether, the ethereal solution expressed and evaporated. Fifty grains of residue were obtained. It was of soft consistence, oily feeling, and bitter-sweet, astringent taste. It yielded thirty grains to alcohol, and the residue of fifteen grains left upon the filter yielded nothing to water.

The residue, when dried, had a waxy, oleaginous appearance, and being warmed left a permanent grease-spot on paper, showing the presence of fixed oil. The alcoholic solution, treated with tr. ferri chloridi and with liq. ferri tersulph., gave a greenish-black reaction;

with Monsel's solution, a less marked coloration; and with solution of ferrous sulphate, a brown coloration.

The alcoholic solution had a slight acid reaction. Thrown into water and filtered, the filtrate gave no precipitate with gelatin. This result appeared to overthrow the work with the infusion of gentian and gelatin solution, and to breed a doubt as to the accuracy of manipulation or the reliability of gelatin as a test for tannin.

As it was stated that neither gentisic acid nor gentiopicrin reacted with ferric chloride, to what body could the coloration be due if not to some form of tannin?

If tannin was present, why did not the aqueous washing of the alcoholic solution of the ethereal residue show it? If the gelatin test was to be relied on, tannin was demonstrated to be present.

The time for the next meeting approaching, I dropped the further study of gentian and started with that of bitter orange-peel. By proceeding as in the case ef gentian, making tinctures showing coloration with ferric chloride and a concentrated decoction for testing with the gelatin solution, I obtained results four times as great as in the case of gentian.

At this stage of my investigations my work was very unexpectedly interrupted by events which precluded study for many succeeding months; the date of the meeting came, and simply to prevent disappointment, I consented to read my paper, which consisted merely of detached notes of the work done.

I closed its perusal with these words: "I have read this paper with hesitation, for it does not seem to me its results can be correct; but as others are to continue the investigation, I thought to lay my work before you and let you form your own judgment as to its value."

In view of all this, I was startled on reading the following in the "Journal of Pharmacy" of March, 1876: "In the face of these numerous investigations, it must appear rather startling to learn that Mr. E. L. Patch, in a paper recently read before the Massachusetts College of Pharmacy, asserted that he found tannin in the gentian, contrary to the usual statements of works on materia medica."

I did not know before reading the paper referred to that any of the sayings or doings of our pharmaceutical meetings were being reported. Had I been aware of the fact, I should not have read the paper. I was much chagrined at the false light I was shown up in by the references to me in the "Journal of Pharmacy" before referred to, but was unable at the time to learn the source of the report upon which my hasty condemnation was based; hence there seemed to be no immediate remedy.

From the paper of Professor Maisch I found that his results with gelatin solution and infusion of gentian differed from mine, but knowing his reputation for thoroughness, I at once concluded that my hasty work was faulty in some particular, and assumed that his subsequent explanation of the reactions of gentisic acid, although contrary to the limited statements I had found in works of reference at my disposal, must end the matter and settle the cause of the reaction with ferric salts upon gentisic acid.

Shortly after the publication of the paper by Professor Maisch, Mr. L. D. Drury, of Boston, arrived at similar conclusions by much the same methods. The subject was further discussed in a thesis by Mr. E. O. Punchard, of the class of 1876, Massachusetts College of Pharmacy.

He also labored under the hallucination that I had attempted to demonstrate the presence of tannin in gentian root from tinctura ferri chloridi giving a dark color with the compound tincture of gentian, containing bitter orange-peel and cardamom as well. Mr. Punchard added ferrous sulphate, precipitated ferric hydrate, and also subcarbonate of iron to both the compound infusion and the compound tincture of gentian, with negative results. Treating gentian root successively with ether, alcohol, and water, the resulting solutions all gave a dark color with tinctura ferri chloridi.

The alcoholic solution decolorized iodide of starch and $K_2Mn_2O_8$, characteristic reactions of tannin, but credited by Mr. Punchard to gentisic acid. From an alcoholic extract, washed with ether, a brownish substance was obtained, having an acid reaction and producing a very dark-green color with tinctura ferri chloridi, but no precipitate with gelatin. This was concluded to be gentisic acid, and to it was ascribed the color reaction in question.

In a paper by Julius Ville (1877), he maintained that the gentisic acid producing the dark coloration with ferric chloride should be ranked with the tannins.

In a paper read by Mr. Edward Davies before the British Pharmaceutical Conference, 1879, he arrived at the conclusion that gentian root contained a trace of gallotannic acid precipitated by gelatin, acetate of cinchonia, and tartar emetic.

This paper was reviewed at length by Professor Maisch, and, as a result of several parallel experiments instituted by him, he was confirmed in his previous conviction that gentian root contains no principle that can be denominated as tannin.

So the matter stood when, in the winter of 1880, I was informed that the query relating to the presence or absence of tannin in gentian root, proposed at the meeting of the American Pharmaceutical Association, had been accepted by me.

As I was not present at the meeting and had given to no one power of attorney, I was at first somewhat indignant that the same mysterious agency that first involved me in the controversy should resurrect the gentian ghost and arouse me from the tranquillity I was enjoying.

The matter having been so thoroughly investigated, I questioned if the intention was to gain more knowledge or to draw me from the mire of non-committal. If more knowledge was the aim, why did not my kind acting attorney accept the query and give the added influence of new investigation? Or, did he think a little judicious goading would benefit me?

Feeling irresponsible for unauthorized committal by proxy, I decided to let the matter rest until such time as I could give it agreeable attention. This intention was modified by the receipt of a letter from Mr. J. U. Lloyd (May, 1880), offering material aid if I undertook to review the work so hastily performed in 1875 and 1876.

Mr. Lloyd proposed to exhaust two hundred pounds of gentian root with alcohol, specific gravity 835, to evaporate the alcoholic percolate to syrupy consistence, and mix with ten gallons of water, which was to be filtered, and evaporated, and forwarded to me.

It hardly seemed right to reject such a generous offer, so I promised to give some time to examination of the product so kindly furnished.

In the meantime I received from Mr. Lloyd, by mail, 0.5 of a bright-yellow, crystalline, very light powder, with the statement that it was from American gentian, and was called by Mr. Kennedy gentisic acid, but he, Mr. Lloyd, considered it to be a fat. He requested me to report upon it. 0.01 was mixed with 10 cc. aqua ammoniæ, without solution. The mixture warmed, a partial solution was effected.

0.01 seemed to require 8 cc. of liq. soda for solution, and the mixture had no appearance of emulsion when diluted with water. The ammoniacal solution was agitated with freshly-distilled petroleum-ether; the ether, separated and evaporated, yielded an amorphous residue.

The ammoniacal solution, filtered and evaporated, yielded an apparently crystalline residue and also amorphous matter. 0.01 was mixed with 40 cc. of water; no solution. Heated, the body fused at 185° F. At a boiling temperature, solution was not perfect, but the aqueous solution, on cooling, yielded a flocculent precipitate that somewhat resembled the original body.

0.01 dissolved readily in 5 cc. alcohol (at 60° F., specific gravity, 822), and 0.06 readily in 5 cc. of boiling alcohol. The solution in boiling alcohol, on cooling, yielded beautiful needle-like crystals.

The alcoholic solution was slightly acid, and gave the characteristic brown color ascribed to gentisic acid. Corresponding in fusing-point, insolubility, and reaction with ferric chloride, without further examination I decided that Mr. Kennedy might be right in styling it gentisic acid.

Mr. Lloyd offered to send me a larger portion for examination, but I preferred to wait till I had some experience with gentisic acid from gentian. Evidently different bodies have received the name gentisic acid, as the following characteristics ascribed to it indicate: Solubility in water: 36 parts, Prescott; 5000 parts, Wittstein; 5000, Stille and Maisch; 3630, Storer; 2000, Gmelin. Insoluble: Trommsdorff. Slightly: Punchard. Solubility in hot water: All unite in considering it more soluble. Solubility in alcohol: All find it soluble in alcohol, but much more soluble in hot alcohol.

Solubility in ether, 2000 parts: Stille and Maisch, Wittstein, Blyth. Moderately soluble in ether: Prescott, Punchard. Freely soluble in ether: Storer, Trommsdorff. Appearance: Brown amorphous mass, Punchard; slight, yellow, needle-like crystals, Prescott, Blyth, Maisch; yellow prisms, Pharmacographia.

The fusing-point, 187° F. and 195° F.; sublimes at 250° C., Pharmacographia. Probably mixtures of fat and acid or of resin and acid have been examined.

EXAMINATION OF MR. LLOYD'S GENTIAN SOLUTION.

100 grams of the solution was mixed with 300 grams of water, was allowed to stand twenty-four hours, and filtered (Filtrate 1).

The residue was of a dark color and supposed to be altered extractive (Residue *a*). Filtrate 1 was digested with litharge to alkaline reaction, and filtered; filtrate 2, containing salts of lead, soluble in water as acetate, etc.

The residue, *b* (consisting of excess of lead oxide and lead combinations insoluble in water, as gentisate, tannate, etc.), was suspended in water and decomposed with H_2S. Filtered from PbS. (Residue *c*.) (Filtrate 3.)

Filtrate 3, aerated till H_2S was expelled (using bellows to force air through the liquid), was neutral to test-paper. It gave a hardly perceptible color with Fe_2Cl_6; with tartar emetic, no precipitate; with cinchonidia sulphate, no precipitate; with gelatin, no precipitate; with iodine-water and ammonia-water, no color reaction; with iodine-water and lime-water, no color reaction; with potassium ferricyanide and ammonia-water, no color reaction; with ammonium molybdate, no color reaction.

The filtrate concentrated by evaporation reduced Fehling's solution. The concentrated filtrate gave a very slight green-black precipitate + Fe_2Cl_6.

It having been stated that lead gentisate is insoluble in water, and gentisic acid being so little soluble in water, residue *c* was washed with alcohol. The alcoholic washings gave no reaction with Fe_2Cl_6.

Filtrate 2 was decomposed with H_2S and, filtered from PbS, yielded a brown-colored liquid that, after expulsion of free H_2S, gave no reaction with above-named tests for tannin.

Filtrate 4: A portion of filtrate 4, distilled, yielded a notable quantity of acetic acid. Filtrate 4, with Fe_2Cl_6, yielded a dark olive-brown color. As acetic acid prevents precipitation of gelatin, filtrate 4 was neutralized with NaHO. The color was very much deepened. Neutralized, it showed no evidence of tannin by above tests, but still browned Fe_2Cl_6. Acidified with H_2SO_4, evaporated nearly to dryness, and washed with ether, a body, supposed to be chlorophyll, was obtained. Residue *a* was dissolved in hot alcohol, and the alcoholic solution mixed with an excess of water. Filtered (filtrate 5), the filtrate gave green-brown color with Fe_2Cl_6, a precipitate with cinchonidia sulphate and tartar emetic, but none with gelatin; and no color reactions with color-tests.

EXAMINATION OF GENTIAN ROOT.

Different lots of whole gentian root were purchased of various dealers, and from them was selected a lot that best corresponded with descriptions of genuine gentiana lutea. Of this lot 400 grams were powdered, and 200 grams of the resulting powder were dried at about 130° C. till it ceased to lose moisture. Loss 13.2 per cent. 100 grams of the dried root were exhausted with ether in a continuous displacement apparatus, the ethereal percolate, subjected to distillation and evaporation till reduced to a small bulk, exhibiting strong acid reaction, and giving, when well diluted with alcohol, a decided greenish-black color with Fe_2Cl_6.

Mixed with water, a layer of fat lighter than water separated. The fat was well washed with successive portions of boiling water, the washings (of a strong acid reaction and slight yellow color) mixed, and, concentrated, gave a brown color with Fe_2Cl_6.

A portion of the aqueous washing of fat, evaporated on a watch-glass, gave a light-brown extract of a bitter taste. The aqueous washings of fat distilled yielded $H\bar{A}$; afterward, diluted and filtered, gave no indication of tannin by above tests. The fat was chilled by placing the beaker on ice, removed to a clean beaker, and digested with 70 per cent. alcohol.

The alcoholic washings of fat had a slight yellow color, somewhat darker than aqueous washings, and gave very slight acid reaction.

The alcoholic washings mixed, allowed to stand two days, precipitated a small quantity of a substance of grayish color (apparently wax), filtered, and evaporated, yielded a residue of a light-yellow color. Redissolved in boiling alcohol, and the solution cooled, a lighter yellow crystalline body separated. Removed by filtration, and washed with hot alcohol to free from fat, and with cold alcohol to free from resin, the residual mass consisted of pale-yellow crystals, not fusible at 212° F., that fused on a watch-glass, and, cooled, assumed a crystalline structure free from any mixture of amorphous bodies.

The gentisic acid so obtained is insoluble in 20,000 parts of cold water and 10,000 parts of boiling water. It dissolves in about 280 parts of cold alcohol and about 120 parts of boiling alcohol (specific gravity .815). It is freely soluble in ether (1 part in 400 parts of ether). Dissolved in alcohol, and shaken with solution of soda and water, it yields a solution free from permanent frothiness, and remaining clear. Its solution in alcohol is very pale yellow, but on addition of solution of soda the color is much deepened. It dissolves in nitric acid, specific gravity 1.42, with a dark-green color. With sulphuric acid it forms a yellow solution, from which it separates unchanged. With Fe_2Cl_6 it gives a deep-brown color. Dissolved in spirit of ammonia, filtered, and slowly evaporated, beautiful yellow-tinted crystals of ammonium gentisate were obtained, soluble in water. The crystals from hot aqueous solution are slender, nearly colorless needles, detached, or arranged in clusters around a centre. From hot alcohol, by evaporation to dryness, clusters of needle-like crystals; from hot alcohol, by slowly cooling, much larger prismatic crystals; from ether, small stellate crystals.

From the cold alcoholic washings of the crystals, by evaporation, a yellow-colored body was obtained, that, on being fused and cooled, assumed an amorphous condition, and, on further heating, carbonized.

This yellow resin still retained a small portion of gentisic acid blended with it, it being almost impossible to free it entirely. This trace could be observed by the reaction with Fe_2Cl_6, and by the crystals of gentisic acid showing in the fused resin.

The specific gravity of the fat, after washing thus with hot alcohol, was .970. A portion of the fat was emulsified with ammonia, and washed with freshly distilled petroleum-ether. The petroleum-ether evaporated gave a whitish-gray body, insoluble in alcohol, cold or hot, partially soluble in ether, freely soluble in chloroform and oil of turpentine, unaffected by alkalies, very adhesive and elastic,—supposed to be caoutchouc.

The remainder of the fat was dissolved in petroleum-naphtha. On standing, as the naphtha evaporated, caoutchouc separated. Filtered, and the remainder of naphtha got rid of by warming, a brown transparent fixed oil remained.

After exhausting with ether, the gentian root was dried at a gentle heat, and subsequently exhausted with alcohol, specific gravity .815, at 75° F.

The alcohol distilled, and the liquid remaining evaporated to a small bulk, mixed with water, further evaporated until the odor of alcohol was gone, filtered and again concentrated, diluted and filtered to separate resin (1), the filtrate (Z) gave no indication of tannin by above tests.

The resin (1) dissolved in hot alcohol, the solution thrown into an excess of water, the mixture filtered, and the filtrate (Y) tested with above tests for tannin. Filtrate acid: With Fe_2Cl_6, greenish-black color; with solution of gelatin, slight precipitate after twenty-four hours; with cinchonidia sulphate, a flocculent precipitate after two hours; with tartar emetic, a precipitate after six hours; with aqua iodinii and aqua calcis, a precipitate, becoming light-orange color. With other tests no reaction.

The water-washed resin (1), dried and shaken with ether, and the resultant yellow ethereal solution evaporated, yielded a small quantity of yellow resin (2), contaminated with a trace of gentisic acid. The remainder of the resin dissolved in alcohol and evaporated, a brown mass was obtained, supposed to be resin (3). The filtrate Z was again evaporated, this time to consistence of a soft extract. This extract was dissolved in water, and the solution allowed to stand twenty-four hours. Decanted, a black, somewhat adhesive residue remained, supposed to be altered extractive. The clear liquid, of intensely bitter taste, was digested twice with animal charcoal, by which it lost much of its color and bitterness.

The animal charcoal was boiled in alcohol, filtered, the charcoal washed with alcohol, the alcoholic liquids concentrated, washed thrice successively with ether, and evaporated to dryness. Result: A very light-brown transparent body, freely soluble in alcohol and water, having an intensely bitter taste. Its aqueous solution is acid, and reduces Fehling's solution with a slight precipitate. If first boiled with a little H_2SO_4, however, it produces a copious precipitate. With Fe_2Cl_6, it gives a dark-brown color; with cinchonidia or tartar emetic, no reaction. Evidently gentiopicrin with little coloring-matter. The ethereal washings evaporated yielded a small quantity of resin.

After exhausting with alcohol the gentian root was dried, and subsequently percolated with water to exhaustion. The resulting percolate, much concentrated, was somewhat bitter, yielded no marked reaction with Fe_2Cl_6, but was rich in pectin and in sugar that quickly reduces cupric oxide.

RE EXAMINATION OF MR. LLOYD'S GENTIAN SOLUTION.

Three pints of the solution, as furnished, were further concentrated and added to excess of water. The separating resin was dried, dissolved in hot alcohol, the alcoholic solution added to excess of water, and filtrate tested for tannin with above tests. Filtrate acid: With gelatin, a slight precipitate; with cinchonidia sulphate, a precipitate; with tartar emetic, a precipitate; with Fe_2Cl_6, dirty-green precipitate; with ammonium molybdate, a red color. The filtrate not subjected to above tests was concentrated, cooled, and filtered. Again tested with above tests: With gelatin, a precipitate; with cinchonidia sulphate, a precipitate; with tartar emetic, a precipitate; with Fe_2Cl_6, a green-black precipitate; with ammonium molybdate, a red color; with aqua iodinii and aqua calcis, a dirty blue, changing to dark brown; with potassium ferricyanide and aqua ammoniæ, a red color.

The liquid not used for above tests was digested with PbO till alkaline, the mixture subjected to the action of H_2S till decomposed, filtered from PbS, boiled to rid of H_2S, filtered, and evaporated.

An amorphous residue of a light-brown color was obtained. It is soluble in water, but forms a slightly turbid solution. It is insoluble in ether, but its aqueous solution, shaken with ether, yields a little coloring-matter to the ether. The aqueous solution is acid. With K_3Fcy and NH_4HO, it gives a red color; with ammonium molybdate, it gives a reddish tinge; with cinchonidia sulphate, a marked precipitate; with Fe_2Cl_6, an olive-green color; with tartar emetic and gelatin, slight precipitates. The body evidently contains a trace of the same body observed before treatment with PbO and H_2S, but, as the reactions are less marked than before treatment with PbO and H_2S, the body has evidently been affected by the heat of concentration.

Had I been looking for so much coloring-matter as was developed by concentrating the aqueous washings of PbS, I should have rejected the filtrate after digestion with PbO, and washed PbO before decomposing with H_2S. The precipitate (a), from mixing the hot alcoholic solution of the residue, obtained by mixing Mr. Lloyd's gentian solution with water, treated with ether, yielded gentisic acid and yellow resin; the residue, treated with alcohol, yielded a brown solution. A little, mixed with water and filtered through a double filter, gave a clear filtrate, with which Fe_2Cl_6 produced a green-black reaction and precipitate.

The alcoholic solution yielded a brown resin free from gentisic acid. After treating the precipitate *a* with ether and alcohol, it yielded but a little coloring-matter to water. Here, in the precipitate of resinous matter, we have a body ranking as a tannin by giving all the reactions previously mentioned. Four times the ground was covered with the same result. It seems to be so combined that it precipitates with the resinous matter. That the reactions mentioned are not due to gentisic acid is evidenced by the reactions being given after all gentisic acid has been removed, by the fact that gentisic acid uncombined cannot be dissolved in water to form a solution strong enough to react. Gentisic acid gives a brown reaction and no precipitate; this body a green-black reaction and dirty-green precipitate.

This body gives in aqueous solution color reaction with ammonia molybdate and $K_3Fcy + NH_4HO$, while gentisic acid does not. By mixing the precipitate *a* with PbO and H_2S, I expect to be able to isolate the tannin body in a comparatively pure condition.

The difference in appearance between my gentisic acid from gentiana lutea and that obtained from American columbo by Mr. Kennedy, led me to submit them to parallel tests, in stating which I will designate the respective bodies as P.'s acid and K.'s acid.

K.'s acid is of a much darker-yellow color than P.'s acid. K.'s acid is much more soluble in water, hot or cold, than P.'s acid, which is nearly insoluble in cold and but slightly soluble in hot water. K.'s acid is soluble in about 400 parts of cold and 70 of hot alcohol, P.'s 280 and 120. K.'s acid is soluble in 100 parts of ether or less, P.'s in 400 parts. K.'s acid fuses at about 187° F., and, on cooling, remains amorphous. P.'s acid fuses at a temperature above 212° F., and, on cooling, becomes a mass of crystals. The alcoholic solution of K.'s acid is much more acid than that of P.'s acid. Both give a brown color, but no precipitate, with Fe_2Cl_6. K.'s acid with pure nitric acid gives a blood-red color, P.'s acid a dark-green color. K.'s acid with pure sulphuric acid gives a carmine red color, P.'s acid dissolves unchanged. K.'s acid is prone to amorphous condition, P.'s acid is always crystalline.

Kennedy's acid from American columbo, consequently, is not identical with gentisic acid from gentiana lutea. Against its being a fat acid or acid resin is the fact of its solubility in water; yet, dissolved in spirits of ammonia and evaporated, an almost entirely amorphous mass results (P.'s acid so treated yields crystals of ammonium gentisate), and its alcoholic solution mixed with solution NaHO and water forms a persistently frothy mixture. Mr. Kennedy's acid is evidently a new body.

Conclusion: The brown color produced on mixing preparations of gentian and ferric chlorides is due in part to gentisic acid and possibly in part to gentiopicrin (not having obtained gentiopicrin in a pure condition this latter statement may need substantiating). Gentiana lutea contains an iron-greening body, producing the reactions of a tannin. Mr. Kennedy's acid from Frasera Walteri does not correspond with gentisic acid from gentiana lutea. While the resins and gentisic acid are insoluble in water, in combination, in addition with the tannin body, coloring-matter, bitter principle, etc., it is very difficult to remove them from solutions of the drug.

NOTES.—The large precipitate obtained in 1876 with concentrated decoction of gentian and solution of gelatin and alum I now see was largely due to pectous substances. Mr. Punchard's alcoholic extract, after washing with ether, gave a marked dark-green color with Fe_2Cl_6. This color he ascribed to gentisic acid, and, as his gentisic acid was an amorphous brown body, he evidently mistook the mixture of resin and gentisic acid for pure gentisic acid, which latter always gives a dark brown instead of a green color with Fe_2Cl_6.

Trommsdorff's description of gentisic acid corresponds more nearly to the facts as I have found them than any other.

The amount of free acetic acid formed in the preparations of gentian doubtless interferes with the precipitation of any tannin body by gelatin.

I have extended this paper so as to cover many of the experiments performed and processes followed because of my inability to be present and make explanations where called for. While my labor has been extensive, I can see it has not accomplished all I might have wished, but trust that it has not been all in vain.

A MICROSCOPICAL EXAMINATION OF THE ROOTS OF APOCYNUM CANNABINUM AND APOCYNUM ANDROSÆMIFOLIUM.*

BY E. B. STUART, CHICAGO.

ALTHOUGH for some time aware that the drug furnished by collectors and secondarily by dealers as apocynum androsæmifolium was identical with that sold as apocynum cannabinum, my attention was more strongly drawn to this fact on the appearance last year of Professor Lloyd's "Supplement to the American Dispensatory," and it was not until that time that a study of the microscopic characters of the two drugs, as likely to afford a means of distinguishing the two species, suggested itself. It is true that the naked-eye appearances of these two roots are sufficiently distinct to render their identification, when entire, a matter of no difficulty, but, overlooking the fact that the greater number of retail dealers do not, and in the Western

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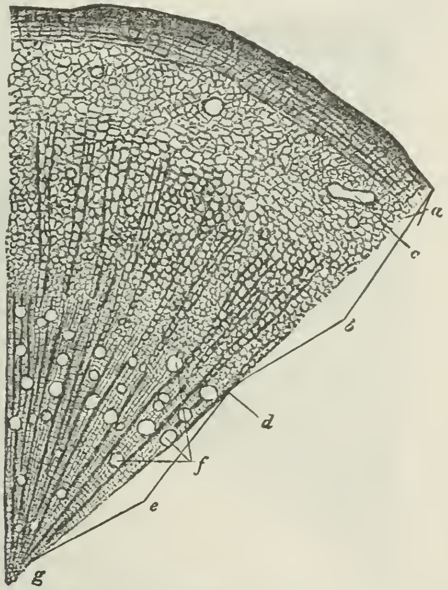
* Read at the Fourth Session.

market at least cannot, ordinarily find it among their wholesalers except pressed, ground, or powdered, it was thought that this description might be of some value. It will be admitted that some general method, by which ground and powdered drugs can, without too great an expenditure of time, or the possession of a high degree of technical skill, be distinguished from each other, and also from the articles used as adulterants and substitutes, is highly desirable. Inasmuch as the compound microscope affords the means of making such examinations, and more nearly fills the conditions of rapid work and ease of manipulation, and at the same time affords the most unmistakable results of any method in use, it is hoped that the results of this examination may serve to direct attention to its value in this field.

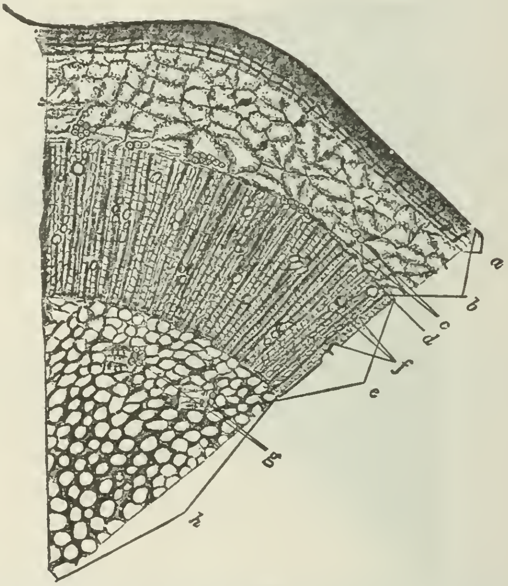
FIG. 94.



APOCYNUM CANNABINUM, TRANSVERSE SECTION.—*a*, Cork cells; *b*, cortex; *c*, lactiferous ducts; *d*, cambium; *e*, wood; *f*, dotted ducts; *g*, pith.

The following description of the gross characters of apocynum cannabinum are from the work just referred to: "This root, when gathered in the autumn and dried, is about one-third of an inch in diameter, wrinkled longitudinally, and marked by occasional transverse fractures through the bark, which show the white central portion. It consists of a bark, externally ash-gray in color, beneath which is a thin brown corky layer, and within this the inner bark, which is of a pale pink color. The remainder of the root is composed of white medullary matter, perforated by numerous white longitudinal tubes or ducts, disposed more thickly in concentric circles about the fortieth of an inch apart, or forming a single circle. Radiating from these are delicate medullary rays. When gathered in the spring or early summer, the centre is pierced by a light pith or a small cavity. The root when dry is brittle, and snaps readily, giving a clear, smooth fracture. As found in the market there are few, if any, fibres attached, although when fresh the root is well supplied with secondary roots, but as they are very brittle when dry, they do not long remain attached." Its microscopical characters are: First, an epidermis of a single row of cells which adheres but loosely to the root; next, a layer of cork varying from four to seven cells in thickness in the specimens examined, the outer rows of which have strongly thickened walls,

FIG. 95.



APOCYNUM ANDROSÆMIFOLIUM, TRANSVERSE SECTION.—*a*, Cork cells; *b*, cortex; *c*, bast cells; *d*, cambium; *e*, wood, *f*, dotted ducts; *g*, bast-like cells; *h*, pith.

the inner, less so, and constituting a layer of cork cambium, or meristem. These cells are separated by a tolerably well-defined boundary from the inner cortical tissue which occupies in general about one-half the diameter of the root. The cells composing this structure are in the outer portion of the zone, quite irregular in shape and size, assuming greater regularity, and decreasing somewhat in size toward the centre, where they approximate to a spherical form. Large lactiferous ducts are found in abundance in this portion of the root, and the cells of this tissue are generally well filled with starch-granules, and when fresh, protoplasm. This zone is limited, interiorly, by a narrow line of cambium, the cells of which are exceedingly difficult to distinguish after the specimen has been dried, and this in turn is succeeded by the medullary sheath, or woody tissue of the root, which, with the exception of a few cells of pith in the centre, occupies the remainder of the semi-diameter of the root. The cells of this tissue are lignified (or woody), and it is composed of three histological elements, comprising large dotted ducts, medullary rays, and prosenchyma. The dotted ducts are numerous and plainly visible to the naked eye, but otherwise present no peculiarity. The medullary rays, springing from the central pith and from the annual rings, extend plainly half or two-thirds through the inner bark, where they lose themselves in the general tissue, and are composed, transversely, of one, and in their central portion frequently two rows of cells, and in their vertical direction of an indefinite number, while the medullary cells are, in the transverse section of the ray, elongated, and vertically are nearly round. The prosenchymatous cells present no features requiring description.

The starch of apocynum cannabinum, as previously stated, is found in the cells of the inner bark. The granules are exceedingly irregular, both in size and shape; they are in fact sufficiently so to make this feature somewhat characteristic. Several successive measurements of twenty grains, taken so as to include, as nearly as possible, all in a given space, gave an average long diameter of .0082 millimeter and .0074 millimeter short diameter. The extremes, so far as measured, were .014 millimeter maximum, and .0025 millimeter minimum. In shape, the more perfect granules are nearly oval, others approach angularity, or are variously contorted, while the smaller grains are nearly round.

In the centre of the woody column are a few nearly spherical pith-cells. Bast-cells, although a prominent feature in the bark of the stem, were not observed in any of the specimens examined.

"Apocynum androsæmifolium has a long, running root. When dry it is contorted, frequently having the woody remains of its stalks attached. It is shrivelled longitudinally, and often marked by transverse fractures, that extend through the bark and show the white woody centre. Occasionally the bark scales off. The root breaks with difficulty, its central part being woody. Externally, the bark is dark brown, white upon its inner surface, and readily separates from the central or ligneous part of the root; it is very bitter. The central part of the root is smooth and firm, bends before breaking, and usually requires considerable twisting before the woody fibres give way. Attached to the root are rootlets, not very plentiful, which bear a general resemblance to the main root, their central portion being woody, and covered by a brown epidermis." The root of apocynum androsæmifolium presents the following histological characters: First, an outer layer of cork, usually from three to six cells in thickness; next, a zone of cortical tissue made up of irregularly shaped cells containing starch, this tissue occupying generally about one-eighth the distance from cortex to centre of the stem. The inner portion of this zone contains many bast-cells, the walls of which are strongly thickened; they are arranged in groups, are quite regular in size and form when examined in transverse section, and from this view show, like starch-grains, a cross under polarized light. The successive layers of their walls, also, show as well-marked striæ. Numerous intercellular spaces are seen in this portion of the cortex. Lying next this tissue, which may be designated as liber, is a narrow ring of cambium, somewhat more prominent than the same structure in apocynum cannabinum, but in the dried root somewhat difficult to resolve into its cellular elements. It appears, however, to be, when fresh, made up of very delicate, thin-walled, nearly spherical cells; or, in other words, it presents no peculiarities distinguishing it from cambium tissue in general. The woody portion of the root succeeds the cambium, and is, as in apocynum cannabinum, made up of prosenchyma and dotted

FIG. 96.

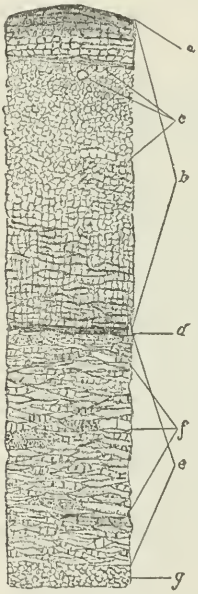


FIG. 97.

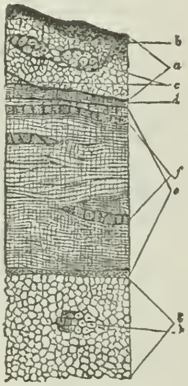


FIG. 96.—APOCYNUM CANNABINUM, VERTICAL SECTION.—*a*, Cork cells; *b*, cortex; *c*, lactiferous ducts; *d*, cambium; *e*, wood; *f*, dotted ducts; *g*, pith.

FIG. 97.—APOCYNUM ANDROSÆMIFOLIUM, VERTICAL SECTION.—*a*, Cortex; *b*, cork-cells; *c*, bast-cells; *d*, cambium; *e*, wood; *f*, dotted ducts; *g*, pith; *h*, bast-like cells.

ducts, interspersed with medullary rays; it is considerably narrower, proportionally, than in its related species, the pith occupying a correspondingly larger space. None of its cells are sufficiently marked to present any distinctive points between the two that otherwise would be of value in the examination of the drugs when finely ground or powdered. The pith-cells are large and very irregular in form and size. Bundles of elongated cells with strongly thickened walls are found in this portion of the root. The starch in this species is exceedingly small and might easily be overlooked unless highly magnified. The granules are tolerably uniform in shape, being generally nearly round or oval, and are far more uniform in size than in the species first described. An average of twenty measurements gives a mean diameter of .00498 millimeter. The largest measured was .0075 millimeter, the smallest .00375 millimeter in diameter. The differences between the starch-granules of these two species of apocynum are so great as to render their distinction by a mere microscopical inspection an easy matter, while the peculiar bast-cells of apocynum androsæmifolium afford an additional feature of value, and the pharmacist familiar with the microscopic appearance of the drugs could determine which of the two was offered, at a glance. The entire operation of mounting the powdered drugs on glass slips, and making such a comparison, should not exceed five minutes. Few of us are so busy that this brief period cannot be spared. The method is applicable to nearly all the powdered drugs of vegetable origin that we use, and the results of such an examination are, in this class of drugs, more reliable and certain than any other method affords. I may be within the limits of reason in expressing the belief, as well as the desire, that a microscope will, in the near future, be regarded as essential to a

FIG. 99.

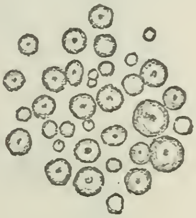


FIG. 100.

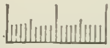


FIG. 98.

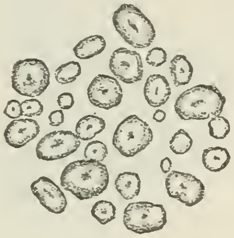


FIG. 98.—Starch of Apocynum cannabium.
FIG. 99.—Starch of Apocynum androsaemifolium.

pharmacy as a test-tube rack now is, and that the ability to use it will be ranked among the ordinary qualifications of the "drug clerk."

NOTE.—In Fig. 98, ten lines of the appended scale (Fig. 100) are equal to one one-hundredth millimeter, and in Fig. 99, thirteen lines are equal to one one-hundredth millimeter. By comparison with a metric scale it will be seen that one is magnified about 650, the other about 800 diameters.

Figs. 96 and 97 are drawn to the same scale, each being magnified about 20 diameters. Figs. 94 and 95 are not drawn to scale. The specimens from which these examinations and drawings were made were furnished by Professor J. U. Lloyd, of Cincinnati.

AN INSTANCE OF ATAVISM IN CYPRIPEDIUM SPECTABILE.*

BY PROFESSOR E. S. BASTIN.

ONE of the strongest proofs of the theory of descent is derived from the fact of atavism, that is, of the occasional reversion of an organism to a primitive or more generalized ancestral type. So interesting and instructive are facts of this kind, and so likely are they to throw new light on structures otherwise difficult to understand, that it seems of importance to science that every fact of the kind be carefully noted. An interesting case in point that came under my observation last June, viz., a monstrosity in a flower of Cypripedium spectabile, seems to me of such peculiar interest that I venture to bring a somewhat detailed description of it before your honorable society.

When botanizing with my class in the pine barrens at the southern end of Lake Michigan, a region by the way that deserves to rank with the pine barrens of New Jersey for the interesting character of its flora, a real botanist's paradise, we found the Cypripedium spectabile very abundant. It is safe to say that our little party of eight or ten gathered in a short time from five hundred to six hundred specimens of this beautiful flower, and we might have had twice or thrice as many if we could have carried them. A more enthusiastic group of botanists I think I have never seen than we were that day,

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* Read at the Fifth Session.

Fig. 101.

Cypripedium Spectabile

for we had chanced to visit our paradise in the acme of its glory, when not only the cypripediums, but a great variety of other desirable flowers were in their perfection. It was from this region that Professor Hills, of Englewood, had obtained, two years before, a magnificent double cypripedium that had two "slippers," one within the other, and our party were all on the *qui vive* hoping that we should have the good fortune to find another. In this we were disappointed, but presently one of my class brought me a specimen that delighted me more than a hundred double ones could have done. It was an almost perfectly regular blossom of spectabile growing on the same stem with one that had the ordinary form.

It had all three sepals, distinct, and of equal size; it had no "slipper" or lip, but the three nearly equal petals were shaped alike, differing from the sepals only in being a little narrower, and of course alternating with them. The ovary, which in most orchidaceæ and in all cypripediums is twisted through half a revolution, in this case was not twisted at all, and it was only slightly instead of conspicuously bent to one side, so that the flower faced more nearly upward than in the ordinary form. The column as usual consisted of united stamens and pistils, but it was much less bent to one side, and the union of parts was not nearly so complete. There were three distinct anthers instead of two alternating with the lobes of the distinctly three-lobed stigma. Instead of one large, dilated, triangular, fleshy body, apparently occupying the place of the third stamen, in the ordinary form, and heretofore supposed in fact to be homologous with the third stamen, there were two of these bodies alternating with the petals and evidently belonging to a distinct whole. They may really be the homologues of stamens, but if so the plan of the flower contemplates two distinct sets of stamens, with three in each set. Or we may, perhaps, with better reason, regard them as petals belonging to an inner whorl that alternates with the first.

The monstrosity, therefore, places it beyond conjecture that the very irregular cypripedium was derived from a remote ancestral form that was regular or nearly so, that had three sepals that were distinct and smiliar in shape, three petals also shaped alike, three bodies (petals or stamens) alternating with them (for the space for the missing one so evidently exists that we must believe it belonged in the plan of the flower), alternating with these three stamens, and with these again three pistils. It adds one more strong link to the long and firm chain of evidence that all irregular flowers have been derived from ancestors that had regular ones, all unsymmetrical forms from symmetrical ones, by some process of gradual adaptation, doubtless largely by insect agency; that the wonderful wealth of interesting forms we find in the Orchid family, from those that possess a slender nectary that only a long-tongued sphinx can extract the nectar from, to those that, like the lady-slipper, have a petal modified into a large slipper-like organ that a bee might crawl into; from the inconspicuous flower of the green habenaria to the gorgeous ones that mimic the butterflies in form and splendor, have all been derived from a tamely regular and comparatively uninteresting form.

One of the drawings which accompanies this description represents the ground plan of the flower, the other, the two flowers as nearly as possible as they actually appeared, the one normal, the other abnormal, growing from the same stalk.

MINUTES

OF THE

TWENTY-NINTH ANNUAL MEETING.

First Session.—Tuesday Afternoon, August 23d.

THE Association assembled in the Masonic Hall in Kansas City, Mo., on Tuesday afternoon, August 23d. 1881, Vice-President George H. Schafer, of Fort Madison, Iowa, in the chair; John M. Maisch, Secretary. The Vice-President called the meeting to order at 3.20 P.M., a large number of members, more than a quorum, being present.

The Secretary read the following letter from President Shinn explaining his absence:

PHILADELPHIA, August 18th, 1881.

PROFESSOR J. M. MAISCH,
SECRETARY OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

DEAR SIR: I sincerely regret being unable to attend the meeting of the Association at Kansas City this year, a fire that occurred on my premises rendering it necessary for me to personally superintend rebuilding and arranging my store. Foreseeing this result some time back, I asked Vice-President Schafer to act for me, and prepare the annual address, which he kindly consented to do.

Please present my kindest regards to the members of the Association, whom I had hoped to meet personally.

With best wishes for a very successful meeting and large accession to our numbers,

I am respectfully,

JAMES T. SHINN,
President American Pharmaceutical Association.

The Chair introduced Hon. D. S. Twitchell, member of the City Council of Kansas City, who spoke as follows:

MR. PRESIDENT AND MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION: Kansas City would not be the city she is and always has been did she not profoundly appreciate the presence of so many distinguished and technically educated gentlemen here to-day assembled in the interest of the dissemination of pharmaceutical knowledge in America. In behalf of the people of this city, and at the request of our mayor, it is my privilege to extend to you a hearty, sincere, and cordial welcome to our young city. Having been a resident of this city for something over sixteen years, and knowing some little of its growth, and some little of the various changes that have occurred since my residence among its people, and having attended perhaps nearly all the conventions that have assembled in this city, I freely admit that at no time have I looked upon a collection of gentlemen whose faces will be longer remembered and more permanently daguerreotyped upon the recollection of this city than those before me at this time.

I esteem it a very great pleasure to welcome you here in behalf of Kansas City. I know nothing of the special reasons or arguments that were influential in bringing you here to this city; but that you have made no mistake, and that you could not have selected a better place, I apprehend your brief stay will abundantly convince you. Here in this city, as you must have beheld and are now ready to admit, exist all the elements and constituents requisite to the upbuilding and establishment of a great commercial centre. As to this question, with the people of this city there remains to-day no doubt. If ever any distrust pervaded the minds of this people upon that question in the past it has gone, and we regard the future of this city as secure; and history will record us and rank us among the great cities of this wonderful country of ours. Here in our State, not only here, but all about us, west of us, northwest of us, and southwest of us, is a great field to be explored by you. You being engaged in this particular line of business, the acquaintance that will be formed by you to-day and during your session here in this city. I apprehend will not only be beneficial to us, but will be beneficial to the sciences, the discoveries, and the commercial pursuits you represent. It is not my purpose to occupy your time. I only perform a duty that is common on an occasion of this kind. But it is more than a mere formal duty, it is one that I perform with an earnest pleasure and pride.

If there is anything that we can promise you, if there is anything in which we can aid you, Mr. Chairman and gentlemen, we hope you will be free to communicate your desire to us, and you can rely on us for the fullest co-operation in the furtherance of your wishes and interests. The time will speedily come when this city can furnish you better, more ample, and more convenient accommodations than at present; but such as we have are at your service. We trust that your stay among us will be pleasant and profitable, and that you will carry with you agreeable recollections from your sojourn among us. Again, I bid you a hearty welcome to our city.

Mr. Robert J. Brown, President of the Kansas State Pharmaceutical Association, made some remarks welcoming the Association to the West, and giving a brief sketch of the geological formations extending westward from the place of meeting.

The Chair, in behalf of the Association, thanked Messrs. Twitchell and Brown for this cordial welcome.

A Committee on Credentials was appointed by the Chair, consisting of Messrs J. F. Judge, of Cincinnati, O.; Hiram E. Griffith, of Niagara Falls, N. Y.; and John Ingalls, of Macon, Ga. The credentials of the delegates were handed in and the committee retired to attend to their duties, when the Vice-President delivered the following annual address:

GENTLEMEN OF THE AMERICAN PHARMACEUTICAL ASSOCIATION: Owing to a fire in the establishment of the President, and the consequent personal attention required in rebuilding, he is prevented attending this the twenty-ninth annual meeting of our Association. It is, therefore, by his request that I am called to preside and deliver the annual address.

Before assuming the responsibility of addressing this representative body of the most learned and scientific men of our profession, I foreshadowed to our worthy President the character of my convictions on what appeared to me to be the most essential subject for your consideration. In this I received his cordial approval, which induced me to fill this place as in the line of my duty as *Vice-President.*

I however appeal to your generosity for mutual assistance in any shortcomings.

Usually an address is arranged to say as much as possible, and to say little to invoke criticism.

I do not believe that this is all that should be expected from a formal address, and, while I cannot fill these expectations, and perhaps as sensitive to criticism as any one, I feel it would be moral cowardice to omit to state my convictions because I feared criticism.

I therefore rely on your good opinion of my motives, and invite your critical consideration of the measures that I may think proper to advance,—the character and prosperity of our profession and business.

The business affairs of the Association proper being by last year's amendments to the by-laws placed under the management of the Council, the several reports of its officers and committees, and those of our veteran Secretary and Treasurer, may be confidently looked to to supply every necessity under that head, thus leaving me to refer to such other subjects as may be of general interest to our profession. The inception leading to the organization of this Association, thirty years ago in the city of New York, was based on the noble purpose of establishing a standard of purity and quality in drugs and medicines, and a standard of qualification for the practice of pharmacy.

It has been eminently and deservedly successful; its field of usefulness has been enlarged to that degree as to receive the strength and influence of nearly fifteen hundred active members, now being rapidly augmented by the increase of membership, and what may be counted on as more gratifying, receiving the voluntary, cordial, and united support and respect of all the local and State pharmaceutical associations of this country, not one of whom, representing in their grand aggregate thousands, where this the parent society represents hundreds, but what represents through their delegates here assembled, their fealty to the parent society (their Pharmaceutical Congress), THE AMERICAN PHARMACEUTICAL ASSOCIATION.

I cannot better represent the power for good emanating from this Association, than by referring to the work accomplished by our local and State associations.

The first object of these auxiliary organizations *was*, and *is*, to secure by unity of action wise pharmacy laws, under which they can expect practical progress in the cause of pharmacy and pharmaceutical education.

As Iowa has the proud distinction of so soon having its pharmacy law considered and enacted by the legislatures of this and other States, I may be pardoned for referring more particularly to *my own State*, as I feel I can best aid other States to like success by giving them the benefit of our experience.

The same necessities exist in nearly all our States for similar pharmacy laws, indeed the leading topics of discussion in pharmaceutical circles, during the past year or two, has been devoted to securing wise and judicious pharmacy laws; it is, therefore, my desire to make this subject the leading topic of my address, and endeavor to awaken more active and united efforts to further secure and maintain legal enactments of this kind, with a view to the highest good and greatest protection to the public, as well as to all legitimate pharmacists.

The establishment of so many teaching colleges of pharmacy is due principally to the various laws in relation to pharmacy, all of which aim for a higher standard of pharmaceutical education, and outside of the teaching colleges it exercises a still greater stimulus on the thousands of apprentices, who cannot attend these colleges, to study and qualify themselves for an examination before *pharmacy boards*, such incentive never having been presented before to many apprentices and proprietors who have been drudging along from year to year, hoping by contact merely to become *practical pharmacists.*

By my experience on the examining board I know many instances of men who have had ten, yes twenty years' experience, who do not pass as good an examination as those of three or four years' experience.

This at once demonstrates the wisdom of laws that require a certain educational qualification to enable or even permit one to practice pharmacy.

These requirements of the State having stimulated a study of works in pharmacy, materia medica, chemistry, and botany, the desire at once created to know more will cause a permanent love for their chosen vocation, and encourage many to become prominent members of the profession.

But shall I speak further of the necessities of these laws, and what further is required under the peculiar relationship we hold to the public as custodians of liquors as well as poisons?

I *hesitate to advance* these ideas before this body, who, at the meeting in Louisville in 1874, voted down resolutions looking to the amelioration of our profession by freeing it from the liquor dealer's license libel, and other encroachments of government on our rights and respects as an honorable but too submissive profession; but I feel impelled by a sense of duty and fear of regret, to again express my sentiments on this point with more confidence when brought before your deliberate attention. especially as the practical features and benefits of the resolution, looking to an increase of membership, has been tested during the past two years by our special committee on membership with such results as to leave no donbt to-day as to the wisdom of those resolutions; furthermore, the adoption at Saratoga of resolutions for the repeal of the Stamp Act, leaves this Association to take but one other step to ratify those resolutions completely.

I, therefore, to-day, submit the same sentiments for your more deliberate consideration. Perhaps the defeat at that time of measures for legislative action, were a "blessing in disguise," as they have necessitated the organization of State pharmaceutical associations, who, in bringing about State enactments, have also found they can be of mutual aid in their annual gatherings, and thus advance the general cause inaugurated by this Association.

But while these associations have been eminently successful in their undertakings, and are all in a flourishing condition, it remains for this intelligent body of pharmacists, so thoroughly organized and distributed in every portion of this country, to exercise a broader influence, which rightly directed will be heeded in the halls of Congress, where we will be able to repeal the obnoxious Stamp Act and secure a *distinction* between a *liquor dealer* and a licensed PHARMACIST.

It is not that we, as a class, wish to shirk paying our due share of revenue, but that we be placed on a fair and honorable footing with simpler modes of paying our taxes. The druggists of the United States have too long submitted to the oppression of unjust laws, stamp acts, liquor dealer's license, etc. They should co-operate, to the end that their intelligence and influence might be directly felt touching matters of legislation affecting their business in relation to the tariff and revenue laws, and by all proper means seek to influence and mould fiscal legislation to that degree that it will abate the excessive burdens that have been heaped upon the drug business in the past, and prevent, in the future, the re-enactment of laws that require more than their due share of revenue from our business.

Over half the articles on our tariff list are drugs and medicines.

Druggists, as a rule, have so much detail work to perform in their overworked and underpaid profession that they pay little or no attention to matters of public policy. The politician, catching an erroneous but general impression that the druggists make four hundred per cent. profit on all they sell, conclude they are a fit and meekly class to bear the burdens of taxation.

If this were all, it would be the least of the evils spoken of, but these burdensome laws impose unreasonable exactions, and contain such excessive penalties that I believe they would not stand a test case if contested on constitutional grounds, which provide against excessive fines and penalties.

Copies of the resolution passed by you at your last meeting indorsing the efforts of the Western Wholesale Drug Association to secure the repeal of the Stamp Act were promptly forwarded by Secretary Noyes to the Commissioner of Internal Revenue and to each member of the Senate and House of Representatives.

A few days before the adjournment of Congress the Committee of Ways and Means adopted the report of Carlisle, from the sub-committee, favoring the abolition of the stamp tax, and instructing him to prepare a bill. It now becomes the duty of every druggist to write to his Congressman to see that that bill is passed the coming winter.

Furthermore, this Association is expected to exercise a general influence, and foster every State or local pharmaceutical association, and, by its superior advantages, continue its grand power for good from ocean to ocean.

It is here, in this great inland city, on the borderland of prohibition, that we should consider, Whither are we drifting? as a profession which must *necessarily be custodians of and dealers in liquors* as well as poisons.

The moral and Christian elements desire the limitation and ultimate suppression of the liquor traffic as a beverage; this involves progressive legislation. Against this are two prominent forms of hostility. One is that interested in the *manufacture and sale* of liquor; the other, that which will admit of no intermediate legislation, but *must have prohibition or nothing* (the latter usually get nothing).

I believe reformers must be content to *regulate* the sale of liquors so far as their work relates to a certain part of large communities.

A permanent temperance reform must come through the establishment of *character* on just and right principles.

But it is not what *I* shall say or you may think of this great problem; it is our relationship to these temperance movements that I would call your attention to, and, as in Iowa, ask for your several States for the most stringent pharmacy law, that also gives a legitimate pharmacist the right to sell liquors and poisons for the *actual necessities of medicine*, and that will effectually put him out of the business if he violates or in anywise abuses the trust. This law has been in satisfactory operation in Iowa for the past year, and is proving satisfactory to all intelligent citizens and true leaders in the temperance cause. I can, therefore, commend it to *other* States for adoption. The result, epitomized, is this: A certificate of registration in Iowa is regarded of such value that many who had, previous to the passage of the law, been selling liquors indiscriminately, turned over a new leaf and gave the law their generous support, thus at once elevating and restoring the legitimate character of our business throughout the State.

Our friends in Illinois have worked very hard to secure a pharmacy law and protection from their dram-shop law, but owing, I believe, to the want of a proper understanding with the temperance people and the selfishness of a few doctors, who wanted to be their own cooks, they failed to secure the protection they deserved in the pharmacy law recently enacted by that State.

Kansas last year, by a vote of the people, amended the constitution of that State, prohibiting the sale of alcoholic liquors. It devolved on the legislature this year to pass laws to carry out this provision of the constitution.

By the provisions of their law, liquors are no longer to be sold at dram-shops or saloons, and only at licensed drug stores under stringent regulations. Druggists are not allowed to sell, even for medicinal purposes, except upon the written or printed prescriptions of a regularly practicing physician, made in case of actual sickness.

And no physician is allowed to prescribe liquors for patients until he has filed an affidavit engaging to obey the provisions of this law. A record of all sales of liquors is to be made by licensed druggists; sales for scientific or mechanical purposes are to be made upon a written or printed application containing the name of the applicant, his residence, the purpose for which the liquor is purchased, with an affidavit appended, made before some officer authorized to administer oaths.

No one can manufacture liquors except for medical, scientific, and mechanical purposes, in which case, to procure a license, the petition must be accompanied by a bond to the State in the sum of $10,000, signed by the applicant, with three sureties worth $7000 each. The sales shall be only to licensed druggists or to persons on written application, as in the case of druggists, for scientific or mechanical purposes, and then in quantities no less than five gallons. The penalties for violation are heavy, and the provisions for enforcing the laws are complete.

While Kansas confers on druggists the legitimate custody and sale of this bane of society, it hampers them with restrictions that probably will defeat the objects of the law. It is to be hoped these may, in the future, be so revised as to afford a practical solution how druggists can conduct a legitimate business even in a prohibition State.

Many other States are agitating the adoption of prohibitory amendments. While few may be successful in this direction, all will pass prohibitory liquor laws of some kind; it therefore behooves this honorable body and its legion of honest supporters throughout the United States and Canada to head our ship in the right direction. I could point out to you manifold reefs and breakers.

If we are sailing in the *right course*, my motto is to steer ahead and claim our rights; and if some who have been sailing in our craft have taken her into by-paths or *wrong inlets*, we should RIGHT HER UP and trim sails for a right course. The change itself will cause misguided craftsmen to topple off, and those who persist in sailing under false colors must be thrown overboard; thus, lightened of THIS BURDEN, our craft will sail on, onward, on a *broader* sea of usefulness and honor for its craftsmen and mankind.

To the principle of association, the practice of bringing men together bent on the same general object, pursuing the same general end, uniting their intellectual and physical efforts to the same general purpose, we may attribute the grandest achievements of our profession.

In these assemblings we have the opportunity to discuss the progress of pharmacy in all of its ramifications and bearings. The answers to papers and queries, which have received mature deliberation, giving attention and regard to those of our fraternity who are blessed with advanced scientific knowledge, and who unselfishly favor us with the results of their studies and investigations, and, by the interchange of opinions, we acquire the knowledge of others and profit by their experience.

Intercourse with other minds is regarded as the general source of knowledge. With our profession books and practical experience are, perhaps, most depended upon, but meeting men face to face and talking over our common interests, relating our several experiences, sharpens our intellects and makes us ready to communicate information as well as to receive it; and to this readiness, this breadth of character, may be attributed the leading cause of the great progress in all scientific pursuits.

Besides this, these gatherings afford a studious and *overworked* profession a relaxation from the cares and anxieties of business and strengthen the friendship formed at previous meetings. At every place of meeting we have some new attraction to repay us for the trip. Last year's meeting at Saratoga Springs refreshed our minds and bodies by the scenes and waters of that celebrated resort, affording us a glimpse of their forty different mineral springs, from whence issue the varied liquid combinations from nature's unfathomable laboratory.

This year we meet in the great land of corn, where CORN IS KING, and, from appearances, this city must be the headquarters of this great American king; here nature reveals more of the processes by which the sun aids generous vegetation, to absorb the chemicals of the earth, and man reaps from this single staple of the earth, *bread, meat, sugar, and spirit.*

Knowledge here reveals to art the hidden resources of nature, "and looks, through nature, up to nature's God."

"Still, mind is up and stirring, and pryeth in the corners of nature,
Often from the dark recesses picking out bright seeds of truth.
Knowledge has clipped the lightning's wings and chained it up for a purpose,
Training to many domestic tasks the fiery bird of heaven;
Tamed it, the spirit of the storm, to slave in all peaceful arts,
To walk with husbandry and science, to stand in the vanguard against death;
And the chemist balanceth his elements with more than magic skill,
Commanding stones that they be bread, and drawing sweetness out of wormwood."

Until comparatively recent times the principles of metaphysical philosophy were not recognized as distinct from those of chemistry. Men of learning gave themselves up to speculation upon the obvious physical characteristics of matter, whilst they neglected the *indirect* observation of their *intrinsic and specific properties.*

The philosophy and logical teachings of Galen, however, outlive speculative science.

The modern student of science realizes that nature will not yield her secrets to the sluggard. To those, however, who acquire knowledge of her laws, and the best means of applying this knowledge, she rewards with success.

I have often wondered that those medicinal agents known as "Galenical" were seemingly neglected or slightingly spoken of by physicians and pharmacologists until ordinary experience and common necessity forced them on their attention.

May we not look to the future of medicine and pharmacy that this branch of study receive more attention?

The story has been so often told, that I will not encroach on your time and generosity to recapitulate the history of our profession. It might be spoiled in the telling.

The scientific review of current pharmaceutical literature, appertaining to the progress of pharmacy during the past year, is in the hands of one of our most talented members, his voluminous annual report being of such a high character, and, withal, so comprehensive that it would be time misspent and effort wasted for me to attempt to interest you.

The meeting of the various pharmacy boards of the United States and Canada is called to meet here this week to perfect an organization similar to that of the teaching colleges of pharmacy, with the object of securing a minimum standard for their examinations, the adoption of measures that will tend to harmonize the various pharmacy laws, to recognize the licentiates of other boards, and by such other means as within their power, to further the objects of pharmaceutical legislation.*

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* Here followed an allusion to the Committee of Revision of the "United States Pharmacopœia." The statements made having been ascertained to be erroneous, the

At a meeting of the Council, held in Philadelphia on the 24th of last June, a motion was adopted that the Treasurer, in his next report, should make it up to January 1st, the end of the fiscal year, with statement of balance in his hands on August 15th. Also, that the photograph albums belonging to this Association be on exhibition at this meeting. All members are invited to insert their portraits.

We are largely indebted to this Eldorado, this Chicago, this St. Louis of the Southwest for its unrivalled railroad facilities of travel, causing many to attend who would not have attended other less favored cities. Much is also due for the substantial benefit resulting from the labors of the Special Committee on Membership, but special praise is always due to the local secretary, who is always the busiest of the busy,—indeed, *he must be*, to well perform the labor of his position. *A practical pharmacist*, however, does all things well. Our profession is oft the training-ship for some of the greatest minds in letters, politics, and the nobler walks of science. In the rapid growth of this Association its roll of membership may soon represent a complete list of the best pharmacists of this continent. To reap the full benefit of this organization, we should be,—yes, *we must be* A GENUINE BROTHERHOOD, united to advance our general cause in every town or city, *State or Territory*, PROVINCE OR KINGDOM of this continent.

The International Pharmaceutical Congress was held this year in London. The President of the Pharmaceutical Society of Great Britain held a reception for visitors on Saturday, July 30th. The business meetings of the Congress were held August 1st, 2d, and 3d, and the proceedings conducted, as far as possible, in English, liberal provision having been made for translating communications in other languages.

The subjects suggested for discussion were:

1st. Equalization of the Strength of Official Pharmaceutical Preparations containing Potent Drugs.

2d. Pharmaceutical Education.

3d. Pharmacopœia Revision.

The first presentation of the "Hanbury gold medal" for high excellence in the prosecution or promotion of original research in natural history and chemistry was on the programme.

The International Medical Congress was also in session in London at the same time.

Major Billings responded for one hundred and fifty American delegates of the Medical and Pharmaceutical Congresses on the occasion of an excursion given them by the Pharmaceutical Society of Great Britain.

In sending my regrets I requested early advices of any important transactions as possibly to enable me to embody in this address, but which had not arrived when I departed for this meeting.

The meeting of both the Medical and Pharmaceutical Congresses at one time and place confirms me in the opinion that it would be well if, at our meeting in 1883, the American Medical Association and the American Pharmaceutical Association would meet at the same time and place, in different halls for the transaction of business, but with but *one hall for the exhibition*. By this, it would seem, we could derive manifold benefits, and perhaps confer on members of the American Medical Association *like benefits*. I mention 1883, as the strong probability that that triennial year will be one when railroad facilities, accommodations *to meet in California*, will be as desirable to the American Medical Association as to our own.

To this end I would suggest that a Conference Committee be constituted to confer

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Association, at its Fourth Session, permitted the erasure of this sentence from the address.—SECRETARY.

with the next meeting of the American Medical Association, and report to our next annual meeting, a few months later. The many advantages and benefits of further harmonizing two great kindred interests would thus be practically brought to the test, and the fact shown to the world that if, in some small communities, their interests still clash, that it is only a relic of past prejudice, and not in the spirit of the times when educated physicians and pharmacists acknowledge that the higher education and progress of medicine and pharmacy are mutually dependent upon each other.

During the perilous times of the past two months, when the peace and happiness of our Union hung as in a balance with the life of our honored and heroic President, and on several memorable occasions, one so recent that our meeting here to-day could not be looked forward to except as one of probable mourning, when the united patriotism of this country, regardless of party, hoped and prayed for the recovery of its CHIEF; *during those momentous times, not yet past*, pharmacy has gone hand-in-hand with medicine and surgery, and done her share to win the plaudits of millions who stood by in breathless anxiety, reading every bulletin, to know how each article of food or medicine—*products of pharmacy*—affected the life which hung as on the last thread of science, sustained by the prayers and sympathies of a people, the glory of which has, perhaps, *never met with a parallel* in the history of the world, the inspiration of which, if the President lives, will give an impetus to every good enterprise and tend to a new era of "peace and goodwill toward man."

Mr. Remington moved the appointment of a committee of three, to consider and report on the suggestions contained in the President's address. The motion was carried, and the Chair appointed Messrs. G. F. H. Markoe, of Boston, J. P. Remington, of Philadelphia, and W. H. Crawford, of St. Louis, said committee.

On motion of Mr. Markoe a vote of thanks was tendered to Vice-President Schafer for his able address, the question being taken by Mr. C. A. Tufts.

The Secretary read the following telegrams:

To GEORGE LEIS: The Board of Managers of the Western National Fair Association, by resolution, instruct me to tender through you to the American Pharmaceutical Association, now in convention at Kansas City, the compliments and courtesies of this Association, and invite them to make us a visit at Bismarck and view the collections of our Western country.

O. E. LEARNARD,
President.

LEAVENWORTH, KAN., August 22d.

To W. T. FORD, AMERICAN PHARMACEUTICAL ASSOCIATION: California sends fraternal greetings and a cordial invitation to hold the next annual meeting in San Francisco.

EMLEN PAINTER,
President California College of Pharmacy.

SAN FRANCISCO, August 22d.

On motion of Mr. Menninger, both dispatches were accepted and ordered to be acknowledged by the Secretary, and the invitation from San Francisco was referred to the Committee on the Place of the next Annual Meeting.

Mr. Gordon moved, that in acknowledging the telegram from Leavenworth, the Secretary be instructed to state that the Association would avail itself of the invitation should opportunity permit.

After some discussion the motion was amended by Mr. Leis so as to read, that the members of the Association accept the invitation if convenient. It was carried as amended.

The report of the Committee on Credentials was read as follows :

The Committee on Credentials respectfully report having examined the credentials accrediting the following delegations:

Alabama Pharmaceutical Association.—T. L. Bradfield, B. W. Williams, John L. Rison, S. W. Gillespie, P. C. Candidus.

Connecticut Pharmaceutical Association.—Hugh H. Osgood, Emil A. Gessner, Frederick H. Chapin, Stephen Goodrich, Thomas S. Main.

Georgia Pharmaceutical Association.—John Ingalls.

Illinois Pharmaceutical Association.—H. Schroeder, H. S. Manard, C. Zimmerman, A. G. Vogeler, George C. Bartells.

Iowa Pharmaceutical Association.—George H. Schafer, R. W. Crawford, George B. Hogin, Emil L. Boerner, C. A. Weaver.

Kentucky Pharmaceutical Association.—Jessie McKenney, Henry Voagh, J. A. Flexner, Henry Fabia, E. Warfield.

Kansas Pharmaceutical Association.—George Leis, T. F. Sturdevant, Oscar Seitz, R. J. Brown, William C. Johnson.

New Hampshire Pharmaceutical Association.—Dr. Charles F. Hildreth, Charles S. Eastman, Charles A. Tufts, Charles H. Martin, Benjamin F. Rackley.

New Jersey Pharmaceutical Association.—John A. Walker, Arthur G. Smith, Jacob Zeitler, C. Vreeland, William Townley.

New York State Pharmaceutical Association.—Professor P. W. Bedford, George Seabury, H. E. Griffith, T. J. MacMahan, William H. Hyler.

Ohio State Pharmaceutical Association.—Professor J. U. Lloyd, J. A. Nipgen, Charles Huston, A. Mayell, T. J. Casper.

Pennsylvania Pharmaceutical Association.—John F. Patten, Charles A. Heinitsh, George W. Kennedy, J. P. Remington, J. L. Lemberger.

Richmond Pharmaceutical Association.—T. Roberts Baker, Jesse Child, John T. Purcell, Henry Bodeker, William H. Scott.

Wisconsin Pharmaceutical Association.—Frederick Robinson, F. F. Prentis, J. A. Dodd, R. Bently, A. Conrath.

Literary and Scientific Society of German Apothecaries, City of New York.—Dr. H. J. Menninger, Charles Eimer, Charles Schleussner, Gust. Ramsperger, Adolph Tscheppe.

Chicago College of Pharmacy.—George Buck, R. H. Cowdrey, A. G. Vogeler, J. H. Wilson, T. H. Patterson.

Maryland College of Pharmacy.—Joseph Roberts, Adam J. Gosman, Louis Dohme, Edwin Eareckson, William S. Thompson.

New York College of Pharmacy.—Dr. H. J. Menninger, Gust. Ramsperger, Professor P. W. Bedford, J. B. Mauch, J. Jungmann.

Philadelphia College of Pharmacy.—Professor Joseph P. Remington, Joseph L. Lemberger, Charles A. Heinitsh, George W. Kennedy, Charles Bullock.

Massachusetts College of Pharmacy.—Professor G. F. H. Markoe, Dr. Charles A. Tufts, A. B. Bayley, F. T. Whiting, Dr. I. Hutchins.

Ontario College of Pharmacy.—W. T. Bray, William Saunders.

St. Louis College of Pharmacy.—Professor Charles O. Curtman, William H. Crawford, F. F. Reichenbach, C. F. G. Meyer, Francis Hemm.

National College of Pharmacy at Washington City, D.C.—W. G. Duckett, Carl Kulberg, John A. Milburn, J. D. O'Donnell, W. S. Thompson.

Alumni Association, Cincinnati College of Pharmacy.—Emil Heun, Ferdinand Kingsback, C. J. Wangler.

Alumni Association, Philadelphia College of Pharmacy.—Edward C. Jones, James Foulk, J. L. Lemberger, Dr. A. W. Miller, William McIntyre.

Alumni Association, Massachusetts College of Pharmacy.—George F. H. Markoe, S. A. D. Sheppard, Charles A. Tufts, James S. Melvin, B. Frank Stacy.

Alumni Association, New York College of Pharmacy.—P. W. Bedford, Arthur J. Moore, Eugene L. Fridenberg, Frank Nadler, Henry C. Schranck.

Alumni Association, St. Louis College of Pharmacy.—Frederick Reichenbach, Henry F. Hassebrock, Francis Hemm, Frederick G. Uhlich, J N. Tomfohrde.

Louisville College of Pharmacy.—Professor C. Louis Diehl, Willey Rogers, John Colgan, Professor Emil Scheffer, George A. Newman,

Cincinnati College of Pharmacy.—Emil Heun, W. J. M. Gordon, J. D. Wells, J. F. Judge, J. U. Lloyd.

King's County Pharmaceutical Society.—G. M. Baker, E. L. Nicot, Dr. E. R. Squibb, W. T. De Forest, J. G. Underhill.

Missouri State Pharmaceutical Association.—P. H. Franklin, A. R. Edmonds, H. M. Pettit, William H. Crawford, J. F. Llewellyn.

Signed, J. F. JUDGE,
H. E. GRIFFITH,
JOHN INGALLS.

The report was, on motion of Mr. Remington, accepted, and on motion of the Secretary, Mr. Edmund Bocking was received as a representative of the recently organized West Virginia Pharmaceutical Association.

Mr. Kennedy, Secretary of the Council, read the names of sixty-two candidates for membership whose applications had been examined by the Council, and explained the new by-laws now in force, according to which, objections to any candidate are to be handed in in writing to the Council, who will have to decide on their admission to membership. The list of candidates was posted in the hall for reference.

Reports of committees being called for, the following were handed in, read by title, and laid upon the table for future action:

Report of the Committee on the Drug Market.
Report of the Committee on Papers and Queries.
Report of the Committee on Prize Essays.
Report of the Committee on Legislation.
Report of the Committee on Membership.

The appointment of the Nominating Committee being in order the various delegations selected one of their number to serve on this committee, as follows:

State Associations.

Alabama,	P. C. Candidus.
Georgia,	John Ingalls.
Illinois,	C. Zimmermann
Iowa,	Emil L. Boerner.
Kansas,	George Leis.
Kentucky,	Jesse McKenney.
Missouri,	H. M. Pettit.
New Hampshire,	C. L. Hildreth.
New Jersey,	J. A. Walker.
New York,	P. W. Bedford.
Ohio,	A. Mayell.
Pennsylvania,	C. A. Heinitsh.
West Virginia,	E. Bocking.
Wisconsin,	F. Robinson.

Local Associations.

King's County,	J. G. Underhill.
New York German Apothecaries,	G. Ramsperger.
Richmond, Va.,	T. Roberts Baker.

Colleges of Pharmacy.

Chicago,	G. Buck.
Cincinnati,	W. J. M. Gordon.
Louisville,	C. L. Diehl.
Maryland,	A. J. Gosman.
Massachusetts,	G. F. H. Markoe.
National, Washington,	W. S. Thompson.
New York,	H. J. Menninger.
Ontario,	W. T. Bray.
Philadelphia,	J. L. Lemberger.
St. Louis,	W. H. Crawford.

Alumni Associations of Colleges of Pharmacy.

Cincinnati,	E. Heun.
Massachusetts,	C. A. Tufts.
New York,	F. Nadler.
Philadelphia,	A. W. Miller.
St. Louis,	Francis Hemm.

It was found that none of the accredited delegates of the Connecticut Pharmaceutical Association was present. In addition to the above the Chair appointed the following five members, who are not delegates: G. W. Sloan, of Indianapolis; A. E. Ebert, of Peoria, Ill.; C. F. Goodman, of Omaha, Neb.; Thomas B. Nichols, of Salem, Mass.; and W. H. Rogers, of Middletown, N. Y.

The Secretary of the Council, G. W. Kennedy, read the minutes of the various meetings held by the Council since the last annual meeting. The minutes inform the Association of the organization of the Council, the adoption of by-laws for its government, and the election of officers and the three standing committees of the Council, which were reported on page 5 of the last Proceedings. The minutes give further information of the business transacted since the last annual meeting, and of the various steps taken to promote the interest of the Association at the present meeting. The Permanent Secretary is charged with placing all albums of the Association on exhibition at the annual meetings; and with notifying delinquent members when the printed Proceedings are distributed to members in good standing. The Treasurer is requested to make his annual report up to the end of the financial year, with a supplementary report of receipts and expenditures to a date near the annual meeting; to state in detail the amounts invested for the Ebert fund, for life membership, etc., and the securities in which they are invested; also to report annually a list of all members who are three years in arrears, in accordance with Chapter IV, Article III, of the by-laws of the Association. The Treasurer and Permanent Secretary were made ex-officio members of the standing Committee on Membership, and an amendment was ordered to be proposed to Chapter VIII, Article III, of the by-laws of the Association, requiring applications for membership to be accompanied by the admission fee and one year's dues. The amendment was laid over for consideration at a subsequent session.

On motion of Mr. A. E. Ebert the minutes of the Council were amended by striking out the titles of members and substituting therefor the initials of their names; and on motion of Mr. William Saunders the minutes were approved.

The Chair appointed the following Committee on Exhibition: A. G. Vogeler, of Chicago, Ill.; T. Roberts Baker, of Richmond, Va.; Joseph L. Lemberger, of Lebanon, Pa.; C. A. Weaver, of Des Moines, Iowa; and J. D. Wells, of Cincinnati, O.

Mr. G. F. H. Markoe offered the following amendments to the by-laws, which, under the rules, lie over to a subsequent session:

That Chapter IX, Article III, Section 4, be stricken out, and that sections 5, 6, 7, and 8 be numbered 4, 5, 6, and 7;

That a new section be added, to be numbered 8, as follows:

SECTION 8. The officers elected by the Association shall take their respective places at the opening of the final session of the annual meeting.

On motion of Mr. Sloan the Association adjourned until Wednesday morning at 10 o'clock.

Second Session.—Wednesday Morning, August 24th.

Vice-President Schafer called the meeting to order at 10 o'clock. The minutes of the first session of the Association and of the Council were read and approved. The latter refer to the admission among the exhibits of non-proprietary homœopathic medicines, to the investigation of the causes assigned as an objection to a candidate for membership, and to the investigation of fifty-eight new candidates for membership.

The following report was read:

The Committee on Nominations beg leave to present the following candidates for election:

President.

P. W. Bedford,	New York.

First Vice-President.

Emlen Painter,	California.

Second Vice-President.

George Leis,	Kansas.

Third Vice-President.

John F. Judge,	Ohio.

Treasurer.

Charles A. Tufts,	New Hampshire.

Permanent Secretary.

John M. Maisch,	Pennsylvania.

Reporter on Progress of Pharmacy.

C. Lewis Diehl,	Kentucky.

Members of the Council whose Term expires in 1884.

Joseph Lyon Lemberger,	Pennsylvania.
William John Maclester Gordon,	Ohio.
John Ingalls,	Georgia.

Committee on Drug Market.

Louis Lehn (Chairman),	New York.
James G. Steele,	California.
Philip C. Candidus,	Alabama.
Thomas Whitfield,	Illinois.
John P. Muth,	Maryland.

Committee on Papers and Queries.

J. U. Lloyd (Chairman),	Ohio.
Starr H. Ambler,	New York.
William W. Bartlett,	Boston, Mass.

Committee on Prize Essays.

C. LEWIS DIEHL (Chairman),	Kentucky.
JOHN F. JUDGE,	Ohio.
EMIL SCHEFFER,	Kentucky.

Committee on Legislation.

JOHN M. MAISCH (Chairman),	Philadelphia, Pa.
SAMUEL A. D. SHEPPARD,	Boston, Mass.
CHARLES MOHR,	Mobile, Ala.

Respectfully submitted for the committee,

CHARLES A. TUFTS,
Chairman.

The report was, on motion, received, and a ballot was ordered on the nomination for President. Messrs. H. Schrœder, of Illinois, and G. B. Hogin, of Iowa, were appointed tellers, and reported the election of Mr. P. W. Bedford, of New York, as President for the ensuing year.

On motion of Mr. Llewellyn, the Secretary was directed to deposit an affirmative ballot for the three Vice-Presidents nominated, which having been done, the tellers reported their election.

On motion of Mr. Menninger, the Secretary was instructed to deposit an affirmative ballot for the remaining officers, members of Council, and committees nominated. The ballot was deposited, and the nominees declared to be elected.

The Chair appointed Messrs. Charles Bullock, of Philadelphia, and C. L. Diehl, of Louisville, a committee to conduct the President elect to the chair. Vice-President Schafer introduced the President elect to the Association, who, on taking the chair, spoke as follows:

GENTLEMEN AND MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:

I sincerely thank you for the honor which has with such harmony and unanimity been conferred upon me. As I look back upon the gathering of this Association which I attended in Boston in 1859, and its yearly recurrences, which I have missed but twice since that date, I count many of the greatest pleasures of my life bound with this Association and the many kind friends I have made and known through its reunions. It has not only been the many pleasures we can thus recount, but the many springs of scientific knowledge which have here been opened,—the growth of intellectual and scientific advancement. The great strides which our profession has taken in developing the work of pharmacy and pharmacists is one of the delightful phases which has grown out of this Association. It has been the forerunner of similar organizations abroad and the great developer of local organizations everywhere throughout our land. It has been the mainspring which has secured the enactment of intelligent and wise pharmacy laws in our States, and will always be looked to as having contributed the soundest principles and details on which such laws, in both the past and the future, shall derive their main value.

This Association has done more to advance true pharmacy than any other influence that can be named. My earnest wishes and efforts have always, in the past, been given to its interests and its extension, and in the future shall never be extinguished till life's labor is done.

In the conducting of duties as they devolve upon me for the time I shall fill the position you have so generously called upon me to assume, I will endeavor to do my best to promote the welfare of this Association. I shall ask your aid in this work by prompt action upon all matters which are brought before you, to avoid needless arguments or a waste of precious time, and trust that all our proceedings may be harmoniously conducted, with the disinterested motive that our neighbor is entitled to the same regard that we have for ourselves.

That this meeting in the border city may be of great benefit and enjoyment to the many brethren who can more conveniently attend it on this occasion than when in the Eastern cities, and that it may awake the spirit of emulation among the pharmacists of the Western portion of our fair land is, I am sure, the desire of those whose familiar faces we miss to-day, as well as of those who have travelled long distances to greet our brethren in their newer homes.

I will detain you no longer than to add my wish that this meeting will accomplish much good for our profession, and that those who are with us for the first time will, in the future, make efforts to aid us by their presence and their labors.

On motion of Mr. Schafer, a committee consisting of Messrs. William S. Thompson, of Washington, and William Saunders, of London, Canada, was appointed by the President to introduce the Vice-Presidents elect who were present, to the Association. The second and third Vice-Presidents were introduced, and said:

MR. LEIS.—Mr. President and Fellow-members: I thank you for the honor you have bestowed upon me, and I trust I may be able to faithfully perform the duties you have imposed upon me.

MR. JUDGE.—Fellow-members of the Association: I return you my sincere thanks for the confidence reposed in me by this election, and I assure you that I will be pleased in the future, as in the past, to perform any duties within my power for the advancement of the interests of this Association. As there is important business before you to be attended to, I will not consume your time in speech-making. I thank you once more for the honor you have conferred upon me.

The Secretary of the Council read the names of the fifty-eight candidates for membership whose vouchers had been examined by the Council.

The Permanent Secretary read the credentials from the Toledo Pharmaceutical Association, accrediting Mr. Thomas Daniels as their representative, and moved that the gentleman be received as a delegate. The motion was adopted, as was also the motion that the invitation of the Toledo Pharmaceutical Association to hold the next annual meeting in that city be referred to the Committee on the Next Annual Meeting, to be appointed hereafter.

Mr. Remington read the report of the Committee on the Drug Market, written by Mr. L. Lehn, which was referred for publication (see page 370).

The report of the Committee on Legislation was read by the Chairman of that committee and likewise referred (see page 375).

Mr. Judge read the following report:

To the American Pharmaceutical Association.

Gentlemen: Your Committee on Prize Essay would respectfully report that, after a careful consideration of the papers read at the twenty-eighth annual meeting of the Association, they have come to the conclusion that none of them are entitled to the award of the Ebert Prize.

Respectfully submitted,
C. Lewis Diehl,
J. F. Judge,
E. Scheffer.

The report was, on motion of Mr. Remington, accepted and adopted.

Mr. Cowdrey read the following:

To the Members of the American Pharmaceutical Association:

The Special Committee on Membership, appointed at the meeting at Saratoga Springs, respectfully report that the work committed to them has been completed in so far as the Chairman and members could give it their attention. The Chairman was unavoidably delayed in issuing the applications and circulars until a much later date than was intended, and doubtless the lack of larger results must be attributed to this delay. We have, however, the pleasure of knowing that the results obtained are an increase of nearly seventy members out of the one hundred and twenty that have or will be submitted at this annual meeting. The results obtained by this Committee during the past two years have been the accession to our membership of about two hundred and fifty new members.

P. W. Bedford,
Chairman.
Edward C. Jones, Ph.G.,
Robert H. Cowdrey, Ph.G.,
John Ingalls,
George H. Schafer.

The report was accepted and referred.

The report of the Committee on Membership was read, as follows:

To the Council of the American Pharmaceutical Association:

In compliance with requirements of the By-laws of the Association, the Committee on Membership would respectfully submit their report.

A revised roll of membership was published with last Proceedings, which can be found on pages from 600 to 620, both inclusive.

REPORT OF MEMBERSHIP.

Members in good standing at last report,		1150
" elected at last meeting,	172	
" of delegates who became members by complying with the Constitution,	4	
Total new membership at last meeting,		176
Making a total membership of		1326

LOSS IN MEMBERSHIP.

By resignation,	15	
Dropped from the roll for various causes,	67	
By death,	19	
Total loss,		101
Leaving a balance at this report of		1225

The list of honorary members remains the same as last year.

The sad and solemn duty now remains of recording the death of the following nineteen members: Richard H. Meade, Richmond, Va.; George Ross, Lebanon, Pa.; Alexander A. Menard, Macon, Ga.; Thomas T. Green, Poughkeepsie, N. Y.; Alfred S. Lane, Rochester, N. Y.; Theron Catlin, St. Louis, Mo.; Hugo Krebs, St. Louis, Mo.; William Neergaard, New York; George M. Snowden, Philadelphia, Pa.; Wilson H. Pile, Philadelphia; Matthew M. Selfridge, Philadelphia; Adam H. Wilson, Philadelphia; John S. Erben, Philadelphia; William H Osborn, Baltimore, Md.; W. T. C. Neate, Olympia, Washington Territory; Alexander C. Bell, Chicago, Ill.; John F. Patton, Bangor, Me.; William C. Mundy, Seneca Falls, N. Y.; Thomas Down, Dayton, O.

It will be observed that death has been busy in our midst, carrying off some of our most useful and valuable members.

Richard H. Meade, of Richmond, Va., died there, after a lingering and painful illness, from disease of the lungs. Mr. Meade was born in the county of Amelia, Va., in January, 1831, and was in his fiftieth year. At the age of fourteen, with his parents, he removed to Richmond. He commenced his career as an apothecary with the late Robert P. Duval soon after his arrival in Richmond, and in the fall of 1850 he went to live with Alexander Duval, who was then the most prominent retail apothecary in Richmond. In 1856 he entered into a copartnership with Mr. T. R. Baker, and they established the firm of Meade & Baker, which was dissolved prior to Mr. Meade's death, on account of his long-continued illness, after an existence of nearly a quarter of a century. Mr. Meade was a man of superior intelligence, quick perceptions, a clear head, and remarkably fine judgment. As a citizen he was unostentatious, public-spirited, enterprising, and universally popular. His refined and courteous manners secured him the admiration and goodwill of all who came in contact with him. The deceased became a member of our Association in 1873, at the Richmond meeting.

Dr. George Ross, of Lebanon, Pa., died there in November last, of congestion of the stomach and bowels, after a brief illness. Dr. Ross was born in Elizabethtown, Lancaster County, Pa., in the year 1821, and was, therefore, in the sixtieth year of his age. In 1838 he went to Harrisburg to learn the drug business under John Wyeth, with whom he remained until 1842, when he was called to serve in the store of his uncle, Abraham Redsecker, in Elizabethtown, the place of his birth. Two years thereafter he purchased the store from his uncle, a friend loaning him the money, as he was entirely without means. He remained in his native town until 1852. It was at Elizabethtown that he began the study of medicine under the care of Dr. Watson, a physician of considerable reputation, and he graduated from the Jefferson Medical College, at Philadelphia, in 1849, when he commenced the practice of medicine, and soon had a large and lucrative business, and was a very successful practitioner. He paid considerable attention to the study of botany, and was considered a good botanist. He removed, in 1852, to Lebanon, opened a drug store, and built up a good business. For many years he was a director of the Valley National Bank, of the Lebanon Dime Savings Bank, of the Lebanon Mutual Fire Insurance Company of Jonestown, and of the Mount Lebanon Cemetery Association. The duties of these several positions, and some of them involved the care of most valuable interests, were attended to by him with the same thoroughness and conscientiousness that characterized his whole life-work. Dr. Ross was an exact man, prompt to his engagements, aggressive, and energetic. He was honorable, and his integrity was never questioned. He became a member of this Association at the meeting held in Atlanta, in 1878.

ALEXANDER A. MENARD died suddenly in March last, in Macon, Ga., of congestion of the brain produced from the effects of a blow given on the head. The deceased conducted the drug business for many years in Macon. He was a genial gentleman, and well liked by the citizens of Macon. He leaves a wife and two sons to mourn their loss. His connection with our Association dates back to 1877, at the meeting held in Toronto, Can.

ALFRED S. LANE, of Rochester, N. Y., died there March 24th, 1881, of pneumonia. Deceased was born in Norwich, England, January 17th, 1822. He was, therefore, fifty-nine years of age. He was but eight years of age when his parents emigrated to this country and settled near Utica. When a young man he entered the drug store of Dr. Marchesi, where he remained seven years,—until 1844. From there he went to Adrian, Mich., and, one year later, being thoroughly conversant with the details of the drug business, he was induced by Dr. L. B. Swan to come to Rochester and act as head clerk in his drug store. Mr. Lane accepted this offer in 1845, and continued in the same until 1852, when he joined with Cyrus F. Paine in partnership, the firm purchasing the establishment of Dr. Swan. From that time to the day of his death he was connected with Mr. Paine in business. In 1852 deceased was married to a daughter of the late James Bond, and his wife is still living. Five children were the issue of this marriage, but all died when very young. Mr. Lane was a man of the highest business integrity. He was of that class of men who take life as it comes and shrink not from the future, although it be pregnant with danger. The example was that of a whole-souled, strong-minded man, and he leaves behind him the greatest of legacies,—an untarnished record. Those who knew him best loved him most. The deceased attended our meetings regularly, and became a member of our Association at the meeting held in Philadelphia in 1857.

HUGO KREBS died in St. Louis, Mo., on April 6th, 1880, after an illness of several years, aged thirty-one years. Mr. Krebs was born in Solingen, Germany, in 1848, and emigrated with his parents to the United States in 1859. After attending school in this country for three years, he entered the pharmacy of F. W. Sennewald as an apprentice in 1862, and after serving his apprenticeship faithfully, graduated in the St. Louis College of Pharmacy in March, 1865. He remained with his employer as first assistant for several years. He subsequently became sole owner of the store in 1874, which he successfully carried on until the time of his death. Mr. Krebs was a competent and reliable pharmacist, and was highly esteemed by his many friends for his honesty and integrity. Deceased was a member of the Association ten years, joining at the St. Louis meeting in 1871.

Dr. John William Neergaard died May 25th, 1880, aged seventy years. Dr. Neergaard was born in Denmark in 1810. He began the study of pharmacy at the age of fifteen, in 1825, and graduated with honors in 1831. In 1837 he established himself as an apothecary, sold out a few years subsequently, and came to this country. In 1845 he graduated in medicine from the College of Physicians and Surgeons of the City of New York, and after practicing for a few years as physician he went into partnership with Mr. J. Shedden in the drug business, at the corner of Bowery and Fourth Street. About a year later the partnership was dissolved, and Dr. Neergaard opened a new store corner of Broadway and Twenty-eighth Street, where he carried on a very successful business. Throughout life he made himself greatly beloved and esteemed by his sterling personal qualities. He was elected a member of the New York College of Pharmacy in 1855, a trustee in 1859, and Vice-President in 1865; the latter position he held for several years. His face was familiar to most members who attended our meetings, as he was rarely absent. He was a member about twenty-one years, having connected himself with the Association at the meeting held in Boston in 1859.

Dr. Wilson H. Pile, of Philadelphia, died there in May last, in the seventy-third year of his age. Dr. Pile was born in Philadelphia, October 12th, 1808. He was the eldest of the four children of William and Sarah Pile. At the age of six years he began attending school in Lombard Street above Fifth. Among his classmates were a number who left a record well known as prominent citizens. At the age of sixteen, in the year 1824, he commenced learning the apothecary business with Elisha Crowell, at the corner of Fifth and South streets. In 1826 he went to Mr. Bigonett, on Lombard Street. In 1828 he engaged with Wm. Hodgson, Jr., Arch near Tenth streets. He remained with Mr. Hodgson until the fall of 1829, when he engaged with Thomas Evans, corner Third and Spruce streets. In 1830 he erected in the shop what he called a "shocking affair, which settles the nerves of no small number of customers daily, and affords amusement to all." Mineralogy and entomology were attractive studies to him about this time, and reference is made to them in his correspondence. In 1831 he began the study of medicine by taking a summer course on surgery and anatomy. The next year, 1832, he left Mr. Evans, and the "wulgar 'pothecary shop," and devoted his whole time to the study of medicine as a profession, and graduated at the University of Pennsylvania in March, 1833. His inaugural essay was "Malaria." Shortly after graduating he moved to Orwigsburg, Schuylkill County, to pursue the practice of his profession. In June of 1833 he married Miss Shultz, previously of Philadelphia. Not meeting with success at Orwigsburg he removed to Montgomery County. After remaining there but a short time he returned to his native city, and taught in the Lombard Street School for colored children, and afterwards in the Northeast Public School, where he remained about nine years. While engaged in this school he lectured on physics, electricity, etc. About 1846 he opened a store corner Passyunk Road and German Street. A year after he removed to Passyunk Road and Catharine Street, where he remained for nearly ten years, when he made another change to the northwest corner of the same streets, where the business was continued by him, with his son as his partner, up to the time of his death.

In 1857 Dr. Pile was elected a member of the Philadelphia College of Pharmacy, and in the same year was elected to the board of trustees of the college, a position which he continued to hold up to the time of his death. His first contribution appears in the "American Journal of Pharmacy" in 1852, "On the Graduating of Hydrometers." The subject of weights, measures, and graduated instruments for accurate observation was a favorite subject to him, and from observation he was gradually led to the manufacture of a number of specialties which acquired a high reputation. For his hydrometers and specific-gravity bottles he obtained a first class medal from the Franklin Institute, the judges reporting them "to be equal to any imported from Europe." In October, 1875, he contributed his experience on the manufacture of dilute phosphoric acid, narrating the circumstances of an explosion which occurred during the operation, and which nearly cost him his life. This was the last of a number of valuable papers contributed by him to the Journal.

While attending a meeting of the Association in Toronto, Canada, in 1877, he was stricken with paralysis of one side, an affection which incapacitated him from further active engagement in business life. A return of the attack was the cause of his death.

The prominent parts of his natural character were perfect integrity, generosity, love of accuracy and truth in all things, cheerfulness often under trying conditions, and a very affectionate disposition. He was modest, unpretending in reference to his own abilities, and respectfully considerate of the rights, feelings, and opinions of others.

He was elected a member of our Association at the meeting held in Philadelphia in 1857, took great interest in our organization, and for twenty years was present at nearly all of our meetings.

DR. ADAM H. WILSON, of Philadelphia, departed this life from hæmorrhage of the bowels. He had been carefully prepared for the apothecary business by Mr. John Moffitt, on North Second Street, and graduated from the Philadelphia College of Pharmacy in the spring of 1856. He commenced business for himself at Front and Master streets, but his literary tastes could not be thus satisfied. He then studied medicine, and graduated from the University of Pennsylvania in 1867. About this date he removed to Third and Susquehanna Avenue, where he continued the practice of pharmacy and medicine. He was a member of the Philadelphia College of Pharmacy, was a man of strong affections and sympathetic nature, and became a member of our organization in 1859, at the meeting held in Boston.

MATTHEW M. SELFRIDGE, of Philadelphia, died there the 22d of May, 1881. Deceased was born in Allentown, Pa., in 1833, and received his education there. After completing his studies he went to Philadelphia, where he entered the drug store of Gilbert & Royal, with whom he learned the drug business. During his apprenticeship he attended lectures at the Philadelphia College of Pharmacy, and graduated from there with high honors. In 1858 he removed to Bethlehem and opened a drug store, which he conducted successfully for several years. In 1864 he opened a drug store in South Bethlehem. In 1866 he sold this establishment. In 1869 he moved into the handsome and substantial building known as the Eagle Block, where he had one of the best arranged drug stores in the place. After several years he removed to Philadelphia, uniting with the well-known house of John Gilbert & Co. as a partner, and continued in business there until the death of John Gilbert, when the firm was dissolved.

Mr. Selfridge had a host of friends, who speak of him as being generous, kind-hearted and charitable by nature, energetic in business and public-spirited as a citizen, which will cause his memory to be kindly cherished by a large circle of friends and acquaintances.

Mr. Selfridge became a member of our Association in 1858, at the meeting held in Washington, D. C.

DR. A. C. BELL, of Chicago, Ill., was drowned on the 17th day of June, 1881, while on a fishing excursion to Lake Superior, his body at this time not having been found. Dr. Bell was born in Lockerby, a town in Dumfriesshire, Scotland, February 26th, 1836. In very early life his parents removed with him to Canada, where he spent his boyhood and the first year of his manhood. He learned the drug business in Dundas, a town near Hamilton, Ontario, and at the age of twenty went into business for himself, in Paris, a town of the same province. He was married at Guelph, January 16th, 1858, to Sarah C. Rogers. In 1864 he went to Chicago as a clerk for G. W. McPherson, whom he bought out, and continued the business until the time of his death. Dr. Bell was a careful and skilful pharmacist, a man of the strictest integrity, a model husband, an affectionate father, and a true friend. He leaves a widow and three children and a large circle of friends to mourn his loss. Deceased became a member of our Association at the Indianapolis meeting in 1879.

William J. C. Neate, of Olympia, Washington Territory, died at his home last December, after a very short illness. Deceased was born in Plymouth, Devon County, England, September 8th, 1845, and was, therefore, at the time of his death, in his thirty-sixth year. He commenced the study of pharmacy when quite a boy, served as hospital steward on an English man-of-war, emigrated to this country, and shortly afterwards went to Portland, Oregon, where he clerked in a drug store. About the year 1870 he removed to Olympia and started a drug store on his own account, and subsequently married Miss Nettie Horton. He was a respected and worthy citizen, and was honored with the position of city treasurer. He leaves a wife and one child, a boy about ten years of age, to mourn his loss. Mr. Neate was elected a member of our Association last year at Saratoga, N. Y.

John F. Patton died in Bangor, Me., June, 1881, after a lingering illness, having been confined to the house for a long time. Mr. Patton was born in Bangor in August, 1842, and at the time of his death was nearly thirty-nine years of age. After receiving an education in the public schools, the deceased entered the drug store of Mr. N. S. Harlow, with whom he learned the drug business. Mr. Harlow says he was a close student, and a very careful and conscientious clerk, careful of his employer's interests, upright in all his dealings, a valuable assistant, and a pleasant companion. An opportunity offering, he began business for himself; at first as a partner with B. F. Bradbury, whose interest he afterwards purchased, and remained proprietor of the same store till his death. He rapidly built up a profitable trade, to which he gave close personal attention. His success in business was due to his integrity, untiring industry, and economy. Mr. Patton became a member of our Association at the meeting held in St. Louis in 1871.

John S. Erben, of Philadelphia, died there the 7th of May, 1881. The deceased was born in Philadelphia, and was about sixty-six years of age. In the spring of 1842 he began to learn the drug and apothecary business with his brother, the late Henry G. Erben, at the corner of Twelfth and Vine streets. In the year 1857 he succeeded his brother, and continued the business successfully up to the time of his death. Those intimately acquainted with Mr. Erben speak of him as earnest, independent, and justly esteemed for his integrity and honorable dealings. The deceased became a member of our Association at the meeting held in Philadelphia in 1868.

George M. Snowden, of Philadelphia, died there recently. Mr. Snowden was raised and educated to the drug business in Philadelphia, stood high as a pharmacist, and bore an excellent reputation as an honest and upright man. He conducted the drug business for a number of years at the corner of Fourth and Noble streets, and was one of the oldest members of the Association, having been elected at the Philadelphia meeting in 1857.

Wm. C. Mundy, of Seneca Falls, N. Y., was drowned in Cayuga Lake, July 1st, 1881. Deceased was born at Seneca Falls, February 10th, 1857, and was in the twenty-fifth year of his age. While yet a lad he entered the drug store of Dr. George W. Davis as clerk, a position he continued to fill with marked success until something over two years ago, when he was admitted to partnership in the concern. He was a correct business man, upright and honest in all his dealings, affable in his manners, and courteous to all. In maturity of mind, independence of thought, correctness of judgment, and conscientiousness of purpose, Wm. C. Mundy ranked high among our worthy young men. Deceased became one of our number last year at Saratoga, N. Y.

MR. THOMAS DOVER, of Dayton, Ohio, died suddenly in Dayton of heart disease while on duty in his store. He was born near Dayton in February, 1829, consequently had just passed his fifty-second year. He began the study of pharmacy when but fourteen years of age, and after serving a satisfactory apprenticeship and as clerk until 1856, he started in business for himself in Dayton, conducting the same successfully up to the time of his death, which occurred on the 21st of April last. Mr. Dover was an active member of the Ohio State Pharmaceutical Association, and took considerable interest in the advancement of pharmacy. By those best acquainted with him he was considered a careful and upright apothecary, and a quiet, unassuming person, kind in disposition, obliging and courteous to all. Mr. Dover became a member of our Association at the meeting held in Indianapolis in 1879.

THERON CATLIN, of St. Louis, died there of hæmorrhage very suddenly on the 17th of January, 1880. Mr. Catlin was born in Litchfield, Conn., in 1840. When quite a boy he came West, located in St. Louis, and began the study of pharmacy with Charles Glein, corner Washington Avenue and Sixth Street, with whom he served a regular apprenticeship, remaining with him about eight years. Subsequently he formed a partnership with his twin brother, Ephron, in 1863, and continued to do business at the same place until the time of his death. The deceased is spoken of as an intelligent pharmacist and fair dealing in all his business transactions. He became a member of our Association in 1871, at the meeting held in St. Louis.

WM. H. OSBORN, of Baltimore, Md., died there in the early part of the present year. The deceased filled several positions of trust, having served as treasurer and vice-president of the Maryland College of Pharmacy, of which institution he was considered a useful and valuable member. He was recognized as an honorable, upright, and esteemed citizen, whose integrity as a business man was untarnished, and whose purity of life and character was acknowledged by all. Dr. Osborn was elected a member of this Association in 1870, at the meeting held in Baltimore.

THOMAS T. GREEN died at Poughkeepsie, N. Y. He was born in New York city, and after entering the drug business applied himself closely and carefully to it during the remainder of his life. He graduated from the New York College of Pharmacy in 1836, which he afterwards served as a trustee for twenty years, and as its treasurer for ten years. For over thirty years he conducted business on Broadway, in New York city, and was always esteemed one of the most careful and conscientious dispensers of medicine in his time. Mr. Green became a member of this Association at Washington, D. C., in 1858.

In concluding this report, the Chairman would return thanks to all officers and members who rendered such valuable assistance when called upon, which necessarily made the labors of the office light and pleasant.

Yours, etc.,
GEORGE W. KENNEDY,
Chairman.

The report of the Publishing Committee was read, as follows:

The Publishing Committee respectfully report that the arrangements for publishing the last volume of Proceedings were completed about December 1st, and the book was sent to the members through the authorized agent and through the mail on April 16th. Most of the woodcuts used have again been obligingly loaned by the publishers of "New Remedies," and by the publishers of the "American Journal of Pharmacy." The expenses for the excellent phototype of the late Professor W. B. Chapman were in part defrayed by his personal friends and former pupils.

The cost of publication of the twenty-eighth volume of Proceedings was as follows:

Phonographic report,		$80 00
Woodcuts and phototype,		115 50
Composition, paper, printing,		1565 06
Binding and wrapping,		307 20
Journals for use of Reporter on the "Progress of Pharmacy,"		5 39
Salaries of Reporter and Secretary,		1100 00
Incidental (exclusive of travelling) expenses of Secretary:		
Telegrams,	$2 59	
Packing-boxes, paper, etc.,	8 60	
Freight and expressage,	70 95	
Postage stamps,	119 25	
Circulars and blank forms,	37 00	
		$238 39
Total,		$3411 54

Bill for the cost of the journals used by the Reporter on the "Progress of Pharmacy" has not yet been received. The items of freight, expressage, and postage, as given above, amount to $190.20, against $197.97 and $223.45 during the two preceding years.

Owing to the alterations in progress since last spring to the buildings of the Philadelphia College of Pharmacy, where the stock of Proceedings is stored, the number on hand could not be accurately counted, but is approximated as follows:

1851.	310 in paper.		
1852.	85 "		
1853.	85 "		
1854.	55 "		
1855.	100 "		
1857.	250 "	15 bound.	
1858.	55 "	8 "	130 loose.
1859.	— "	38 "	
1860.	— "	200 "	
1862.	— "	275 "	
1863.	— "	255 "	
1864.	175 "	110 "	
1865.	150 "	24 "	
1866.	65 "	75 "	
1867.	150 in paper.	84 bound.	
1868.	58 "	148 "	
1869.	100 "	140 "	
1870.	110 "	75 "	
1871.	96 "	56 "	
1872.	99 "	2 "	
1873.	20 "	85 "	
1874.	130 "	20 "	
1875.	68 "	30 "	
1876.	45 "	36 "	
1877.	50 "	68 "	
1878.	63 "	108 "	
1879.	25 "	110 "	
1880.	82 "	50 "	

The insurance on the property of the Association is continued in the German Fire Insurance of Philadelphia in the sum of $2500, at an annual premium of $15.

In April last the Permanent Secretary received, through Messrs. W. R. Warner & Co., of Philadelphia, an order from the Pharmaceutical Society of New South Wales, for a complete set of the Proceedings. After consulting the Council, those volumes which had not been previously sent by mail, were delivered and presented, in the name of the American Pharmaceutical Association, to the library of the Pharmaceutical Society of New South Wales.

Joseph P. Remington,
C. Lewis Diehl,
William Saunders,
W. J. M. Gordon,
J. M. Maisch.

The Permanent Secretary read the following special report, which was likewise referred for publication:

To the American Pharmaceutical Association: At the last annual meeting the editor of the Proceedings was charged with the clerical alteration of certain by-laws under the following resolution:

Resolved, That all by-laws in conflict with the chapter on "Council," as adopted at this meeting, be and the same are hereby repealed or amended, so as to conform therewith.

Chapter IX, Article III, Section 5, as printed in last year's Proceedings, is liable to misconstruction as if it was at variance with Chapter VI, Sections 2 and 3. The section now reads: "The Council shall present names recommended for membership, when a ballot shall be ordered for their election." In order to remove all liability to misunderstanding, the last sentence will have to be omitted, so as to make the section read: "The Council shall present names recommended for membership," and this alteration will be made by the editor of the Proceedings in the next annual volume, under the resolution quoted above.

Attention is also directed to a misprint in the Proceedings for 1879. On page 794, in the report of the committee on the Secretary's and Treasurer's report, the recommendation, which was subsequently adopted, that in the future our fiscal year commence June 1st, should read, "that in the future our fiscal year commence January 1st," as is shown by reference to the original report of the committee, which has been examined by the Council.

The Permanent Secretary desires to express his obligations to the authorized agents, who have kindly aided him in the performance of his duties.

J. M. Maisch.
Secretary.

The Permanent Secretary also read the following telegrams sent by him under the instructions received at the first session:

To Emlen Painter, San Francisco, Cal.: Greetings are heartily reciprocated. Thanks for invitation. Meeting a success.

J. M. Maisch,
Secretary.

To O. E. Learnard, President, etc., Lawrence, Kan.: The members of the American Pharmaceutical Association thankfully accept invitation to visit Bismarck if convenient.

J. M. Maisch,
Secretary.

On motion of Mr. Markoe, the Association visited the exhibition room, and then adjourned to meet again this day at 3 o'clock p.m.

Third Session.—Wednesday Afternoon, August 24th.

President Bedford called the Association to order at 3 P.M. The minutes of the second session were read and approved.

The President announced that invitations had been received from the druggists of Kansas City and vicinity for conveying the visiting ladies through the city and its surroundings, carriages to be in waiting at the hotels at 6 o'clock this afternoon; also for a reception to the visiting members and their ladies at the hall of the Board of Trade on the evening of Thursday.

The Secretary of the Council read the minutes of that body, giving information of its organization by the election of Joseph P. Remington, Chairman; W. J. M. Gordon, Vice-Chairman; G. W. Kennedy, Secretary; and of the following chairmen of standing committees: G. W. Kennedy, on membership; S. A. D. Sheppard, on finance; and J. P. Remington, on publication. The minutes also stated that a messenger had been employed, and that hereafter the Local Secretary would be requested to engage a messenger at the annual meetings; also that of the candidates proposed at the first session, one name had been withdrawn, and that the following sixty-one were duly elected members of the Association:

Arkansas.

Martin A. Eisele, Hot Springs.

Colorado.

Edmund Louis Scholtz, Denver.
Frederick Steinhauer, Denver.
Arthur Walbrach, Denver.

Illinois.

George C. Bartells, Camp Point.
Emil Augustus Zahn, Chicago.

Indiana.

George Frederick Borst, Indianapolis.
Nathaniel S. Driggs, Indianapolis.
Herman E. Frauer, Indianapolis.
Michael C. Staley, Indianapolis.

Iowa.

William Cullen Bryant, Cedar Falls.
William Henry Hardy, Clinton.

Kansas.

Frank J. Behne, Sabetha.
A. J. Roberts, Peabody.
George Walker, Girard.

Kentucky.

William Leopold Hardigg, Uniontown.
Charles C. Martin, Lewisport.

Louisiana.

Thomas Henry Morris, Shreveport.

Maine.

Caldwell Sweet, Bangor.

Massachusetts.

Frank Otis Pilsbury, Walpole.
Duane Burnett Williams, Worcester.
Warren Horton Woodman, Danvers.

Missouri.

Augustus R. Edmonds, Miami.
John A. Gallagher, Kansas City.
Charles Adolph Lahme, Kansas City.
Charles Edward Love, Kansas City.
Charles Walker, Hannibal.

New Hampshire.

Andrew P. Preston, Portsmouth.

New Jersey.

Arthur G. Smith, Belvidere.

New York.

Francis Drischler, New York.
Conrad H. Ihlefeld, New York.
Julius Laber, New York.
Walton Caldwell Tidball, New York.
David Tuska, New York.

North Carolina.

John K. McIlhenny, Wilmington.

Ohio.

Conrad Bohl, Watertown.
Louis Dreher, Cleveland.
Hugh W. Evans, Delphos.
Samuel B. Evans, Circleville.
David J. Foland, Wilmington.
Frederick L. Geigelein, Cleveland.
George W. Glines, Cleveland.
Louis Keiper, Cleveland.
Peter Paul Kirchhofer, Masillon.
Henry F. Kurfurst, West Liberty.
Jacob L. Leist, Napoleon.
Jacob F. Marquardt, Tiffin.
Arthur F. May, Cleveland.
I. N. Reed, Toledo.
Ernst Schueller, Columbus.
George Horace Somers, Canton.
Theodore Troupe, Springfield.
Jacob P. Urban, Cleveland.
Franz Weichsel, Cleveland.

Pennsylvania.

James Hair, Wilkesbarre.
J. Thomas Hoskinson, Jr., Philadelphia.
Gustavus Pile, Philadelphia.
J. Edwin Smenner, New Wilmington.
William S. Zeller, Bellefonte.

West Virginia.

Asher Christian Nagle, Wheeling.

Wisconsin.

Henry Lee Warne, Whitewater.

The minutes of the Council were, on motion, approved.

The Secretary read an invitation, signed by the Wisconsin delegation, to hold the next annual meeting in the city of Milwaukee, and he moved that a committee of three be appointed to report on the time and place of the next annual meeting. The motion was carried, and the Chair appointed Messrs. William Saunders, of London, Ontario; C. Huston, of Columbus, O.; and W. H. Rogers, of Middletown, N. Y., said committee.

Mr. Seabury moved that hereafter the members of the Association bear their own entertainment expenses, and that such expense be not greater than five dollars for each member, including a lady. The motion was seconded by Mr. Menninger; but on motion of Mr. Gordon, the Association voted, by 50 ayes to 17 nays, to lay the subject for the present upon the table, until after the report of the Committee on the next Annual Meeting shall have been received and acted on.

The reading of essays being called for, Mr. Remington read a paper, by Mr. Edgar L. Patch, in answer to Query 13, on the cause of the reaction between Tincture of Ferric Chloride and Compound Tincture of Gentian (see page 457).

SECRETARY MAISCH.—I have listened with a great deal of interest to the reading of this valuable paper, and wish that I could have carried all the facts which have been stated, in my mind; for I should like to say more about it than I can say now without remembering those facts. The historical statement given by Professor Patch is in the main correct. I am, however, sorry that he does not refer to the origin of my paper on the subject. An abstract of Professor Patch's remarks before the Massachusetts College of Pharmacy was published in the "Druggist's Circular," and was, therefore, public property. I held views opposite to those that were expressed at that time, and being familiar with many investigations on gentian, I came to the conclusion, that in the face of these investigations it appeared rather startling that Professor Patch should make such assertions as appeared in the "Druggist's Circular." Hence my paper was written, and I had a right to critically inquire into the correctness of published statements. On the other hand I can say that I am very glad that Professor Patch has gone to the trouble of preparing a gentisic acid which appears to be in an absolutely pure state. It is evident that I did not prepare it as pure as he did. All the gentisic acid which I made yielded, with salts of iron, a dark brown-green color instead of a brown color, as Professor Patch states. Therefore the conclusion he arrives at is correct, that that body which gives a green color with salts of iron is different from gentisic acid. It is left uncertain whether or not that is tannin. The experiments recorded here, as far as I remember them from having heard them read once, seem to me to lead to the conclusion that there is no tannin present. There is one very simple experiment which I described five years ago, namely, the precipitate obtained with gelatin, when thoroughly washed with water, as long as the water removes any foreign soluble matter, will not be colored by salts of iron. That seems to be pretty conclusive evidence that there is no tannin present. The views held by various investigators were rather curious. M. Ville said that gentisic acid was a variety of tannin, while Mr. Davies stated that fresh gentian contained the same tannin that is contained in nutgalls. I believe that these views are entirely untenable; and while it is evident from these experiments that a body is present in gentian that gives a dark-green color with salts of iron, I do not believe that the experiments that have thus far been put on record, indicate that this body is really a tannin. I still hold that gentian, whether fresh or dry, is free from tannin.

MR. KENNEDY.—I would like to say a few words in relation to gentisic acid as prepared by myself some years ago. Professor Patch states that it was of a dark-brown color, but that obtained by me was rather of a light-yellow color.

MR. MAISCH.—He says yellow.

MR. KENNEDY (resuming).—When I isolated the body I submitted it to such tests which were given in some works for gentisic acid; and as it agreed with the reactions attributed to gentisic acid extracted from gentian root, I came to the conclusion that it was identical with the latter. I found it varied considerably as to the amount of yield, one lot yielding a larger portion of gentisic acid than another. I only operated on small quantities. Since that time a small vial was sent to me by Mr. Lloyd, of Cincinnati, who said he thought it was similar to that isolated by myself. I made a few tests and it seemed to agree.

MR. J. U. LLOYD.—I thought that by taking one or two hundred pounds of reliable gentian, grinding it together carefully, and percolating this large lot with alcohol, thus getting a large amount of the root mixed together, it would, perhaps, give a more definite result than by taking one or two or three different lots in different parts of the country. For then the query would be rising in the mind, "Is the gentian we are working with the same article in each case?" I furnished this lot to Professor Patch. It was imported for that purpose. Professor Patch did find tannin in that.

SECRETARY MAISCH.—He says it contained an iron-greening body, having reactions similar to those of a tannin, but Mr. Patch does not say it is tannin.

MR. LLOYD.—I wish to say further, that there are specimens here of gentisic acid that can be examined by the microscope.

Mr. Menninger read a paper by Mr. Charles Rice, in answer to Query 7, on the Most Desirable Melting-point of Petroleum Ointment (see page 430).

Mr. Menninger.—You will remember that Mr. Rice, in this paper, laid stress upon the melting qualities of petroleum ointment when mixed with wax. He says it will keep for a reasonable length of time, provided the petroleum ointment—vaseline—be fresh. On that point I would like to say a word. The manufacturers of the various petroleum ointments lay great stress upon the fact, that it never becomes rancid, and advertise to that effect. It is about time that was ventilated. While petroleum ointment does not very readily become rancid, it will become rancid in time. Most of you have observed the influence of light upon petroleum ointment, vaseline, and other products of that character. Occasionally I have purchased fifty pounds of vaseline and have put it in bottles for sale. I have found, after being exposed to the light for a time, that vaseline and cosmoline become much darker.

Mr. Remington.—I would like to say a few words on this subject. The Pharmacopœia Committee have had under discussion for the last year the subject of paraffin ointments. A number of us have very nearly made up our minds as to what the pharmacists of this country desire in that direction. The physicians on the committee, at least some of the physicians, seem to have a very strong desire to have more than one paraffin ointment. They wish to have the ordinary vaseline or cosmoline, one having a melting-point of about 100° F., one of about 112° F., and one of about 125° F. They do not wish the latter made by the addition of wax, but they wish them furnished by the manufacturer. It is almost impossible to get such paraffin ointments and such petroleum products. As Mr. Rice has pointed out in this paper, when physicians want an ointment having a higher melting-point, they can order it in their prescription, by ordering the ordinary vaseline or petroleum ointment to be melted with a definite quantity of yellow wax; then they get it as they want it. I should like to have a vote taken on this subject by the American Pharmaceutical Association, and I move "that the American Pharmaceutical Association request the Committee on the Revision of the Pharmacopœia to make but one petroleum ointment officinal, and that one to have a melting-point of about 104° F., as near as possible."

A Member.—I would like to make one correction. 40° of the Centigrade thermometer equals 104° Fahrenheit, and 46° Centigrade equals 115° Fahrenheit.

Mr. Remington.—I should have read 115° F. in connection with 46° C.

Mr. Thompson.—Before that motion is put I would like to have Mr. Remington amend it. I think as we are now making this preparation officinal we should take the preparation with which we have had the most experience. I do not need to name any one of the various preparations now on the market, because there are several of them that in my judgment are equally good; but there are none which would answer to the requirements of a melting-point of 104° F. They are all a little less than that. I should like to have Mr. Remington's motion amended if he will permit it, and have it read that the petroleum ointment introduced into the Pharmacopœia be such in its characteristics as will apply to the articles now known in commerce. The question is whether the medical profession should be supplied with those articles always melting at this particular degree of heat. That would be an experiment, because we have had no such preparation tried. It would be almost too much to introduce into the Pharmacopœia a preparation with which no man has had any extended experience. I think we should take in the initial step that which we know something about.

Mr. Remington.—I heartily agree with the remarks of Mr. Thompson. They are my own views. I think that he failed to notice that I qualified that "104" by "about." That is the melting-point at present in use. The argument that I have held all along in this discussion with the Pharmacopœia Committee is the reputation which this ointment has made; it has a large sale all over this continent and in Europe; it is the article known in commerce as cosmoline and vaseline. It would not be advisable to introduce into the Pharmacopœia an article which has not been tried. I accept Mr. Thompson's suggestion to make it about 104°.

Mr. Thompson.—With that explanation of Mr. Remington's, for we are both trying to attain the same object, I withdraw my motion.

The motion of Mr. Remington recommending the admission into the Pharmacopœia of one petroleum ointment, having a melting-point of about 104° F., was carried unanimously.

Mr. Sloan.—While the subject of petroleum ointment is before the Association I would like to make an inquiry. It is stated that with some petroleum products one cannot succeed in making a nitrate of mercury ointment. I would like to inquire whether any member has succeeded in doing it?

The President.—The question is whether any member has had any experience in the use of paraffin in preparing the ointment of nitrate of mercury.

Mr. Thompson.—I have used paraffin ointment partially. There is a slow reaction between paraffin ointment and nitric acid, but it is not such as it should be for the preparation of the ointment. I used a solution of nitrate of mercury with lard, heated at 104°, using about one-fourth of the quantity of lard, and making up the deficiency with paraffin. With paraffin alone I think you would have to alter the formula.

Mr. Baker.—I have used cosmoline instead of lard and oil according to the directions of the United States Pharmacopœia, and I have succeeded perfectly; after keeping it a long time I have had no trouble with it.

Mr. Remington.—I would like to ask whether Mr. Baker had a bright-yellow color, whether the characteristic color of citrine ointment was produced?

Mr. Baker.—It did not have a bright-yellow, but rather a brownish color. It seemed to have the characteristic properties required.

Mr. Remington.—That brings the discussion to the point I wish to get at. Citrine ointment, when properly made, consists principally of elaidin. You may get elaidin from any vegetable oil you choose, but neither of these soft paraffins contain olein, and, unless you have something which contains olein, I do not think you can get a pharmaceutical preparation as directed by the Pharmacopœia.

Mr. Markoe.—The soft paraffins of the market, constituting the various forms of petroleum ointments, agree in behavior towards chemical agents with the hard paraffin, or the so-called paraffin wax of the market. All the paraffins are remarkable for their indifference to the action of chemical agents, the strong mineral acids and the caustic alkalies having very little, if any, action upon them. This being true, it follows that the addition of a solution of acid nitrate of mercury to any form of petroleum ointment will only result in the formation of a mechanical mixture of the two substances. This can be proven by the fact that the nitrate of mercury can be easily separated from the soft paraffins by the action of heat sufficient to melt the petroleum ointment, and then allowing the mixture to cool. The nitrate of mercury will be found as a liquid layer under the petroleum ointment. The only way in which petroleum ointment can be used for the preparation of citrine ointment is in connection with some vegetable or animal oil. I have never had any practical difficulty in preparing citrine ointment, and in a pretty extensive manufacturing experience have had good results with a variety of fats. I like a mixture of good olive oil and lard better than any other basis. If due care is taken to use nitric acid of full officinal strength, and all manipulations are performed in porcelain or stoneware vessels, I am sure any careful pharmacist can get good results.

Mr. Baker.—I would like to ask if any members have used fresh butter from the churn without any salt? I have done so, and have made a very satisfactory preparation, but then I do not think that the preparation keeps as well as that made with cosmoline.

Mr. Sloan.—Equal parts of lard and lard oil is all that is to be desired, being careful not to raise the heat too high. That makes an ointment that will keep indefinitely. My object in asking about this petroleum ointment was because of a communication I had. What I wanted to know was whether it were possible to make it without the addition of a fatty body. My impression is that there is no reaction where petroleum ointment is used.

Mr. Llewellyn.—I have made a citrine ointment with cotton-seed oil, which is very nice and has a light color. In one or two cases it was too soft for warm weather.

Mr. Vogeler.—Leaving out the physical properties of the ointment, I would like to inquire what is the general opinion as to what constitutes the active property of nitrate of mercury ointment, whether it is simply nitrate of mercury or whether it is mercury in another form,—whether olein has anything to do with it?

Mr. Markoe.—In regard to fresh butter, it has long been known that it makes an excellent citrine ointment, and I do not hesitate to assert that pharmacists can make a good ointment with any good olein. The quality and color depend upon the care in manipulation.

Mr. Ebert.—I would like to inquire what medicinal properties are expected from citrine ointment, and as to the chemical reaction taking place between the fatty body and the nitrate of mercury?

Mr. Remington.—I do not like to say too much on this subject, but I will attempt to answer that in this way. The United States Pharmacopœia describes the ointment of nitrate of mercury. While I believe in departing from the Pharmacopœia wherever real improvement can be made, because in that way only can the Pharmacopœia be revised, yet we are not justified in sending out any ointment in which reaction has not taken place between the nitric acid and the olein fat; I do not care what fat you use, whether it is lard, olein, or lard oil. The Pharmacopœia desires and intends that the olein shall be changed by the nitric acid, otherwise there would be no further directions to heat it to a certain temperature. The object of the heat is to produce the reaction. The object of Rother's process is to facilitate that; the nitric acid acts upon the olein in the lard and converts the olein into elaidin, and with this the nitrate of mercury is incorporated. So far as I know that point has never been investigated therapeutically, as to whether an ointment made by simply mixing the ingredients is as good as the ointment made in the manner described by the Pharmacopœia.

Mr. Ebert.—I made this inquiry because I have frequently had remarks made in regard to this ointment by physicians who found at different times different results in the application. One physician, particularly, who called my attention to it, was Dr. Hildarth, who had charge of the eye and ear infirmary of the United States army. His direction was to have the nitrate of mercury ointment made up some six or eight months previous to its use. He said that the ointment that had freshly been made according to the directions of the Pharmacopœia was not suitable for his purpose, that it was too acid in its character. I think, on the whole, that the directions for preparing this ointment are too antiquated, and that there are no two preparations alike in properties to be found in different stores, and that the same preparation is not made twice alike by the same person. If we could modify this formula in some way, so that we could have a definite preparation, I think it would do much to do away with this vexed question.

Mr. Markoe.—No doubt the varying character of this ointment is due to ignorance on the part of druggists as to what strength of nitric acid is to be used, and also in the interpreting of the directions of the Pharmacopœia.

Mr. Ebert.—It is true there is a difference between the druggists of the East and the druggists of the West. The druggists of the West follow the directions of the Pharmacopœia strictly.

Mr. Lloyd.—I think the members will find that even though they use the same formula, and apparently the same operations, the citrine ointments will differ, however desirous they may be of making them alike. No one can make three batches of ointment that will be exactly the same. They will find a great deal of trouble with the temperature, as we do here in Kansas City.

Mr. Vogeler.—If simply nitrate of mercury is desired in the ointment, then, of course, the process should be changed, and the nitric acid ought to be greatly reduced in quantity.

Mr. Lloyd.—Citrine ointment made with cod-liver oil is in demand among the oculists of Cincinnati and in other parts of the country. It is known as "brown" citrine ointment.

Mr. Lemberger read a paper on the Manufacture of Milk-sugar in the United States, in answer to Query 10 (see page 436), and exhibited a sample of milk-sugar made in this country.

Mr. Lemberger.—When I accepted this query it was not my intention to attempt the manufacture of sugar of milk, but simply to ascertain what others had done, and whether it could be a profitable business. In order to get at the facts I prepared a letter of queries, which I sent to reputable manufacturers of cheese. I inquired if they manufactured sugar of milk, and, if so, what process they used, what was the yield per gallon, and if they knew the amount manufactured in this country, etc. Of the communications and queries sent out I received but one answer that is worthy of presenting to this Association, and which is incorporated into the paper.

Mr. Ebert.—We certainly ought to thank Mr. Lemberger for the solution of this question, which has been before the Association for ten years. Some six months ago I was called upon by a party who introduced himself as a cheese manufacturer, living in the neighborhood of Peoria; I have forgotten his name. He wanted my opinion in regard to the manufacture of milk-sugar. I gave him such information as I had gathered on the subject, and he promised to let me know how he was getting along. I have never heard from him since. I believe that this paper by Mr. Lemberger, with the statistics, will help very much in developing this industry. It is really astonishing that we should import annually $25,000 worth of this article when we can certainly make it at home much cheaper than they do in Europe.

Mr. Lemberger.—Mr. Hallberg has paid some attention to the manufacture of milk-sugar, and I think the Association would be interested in hearing him upon the subject.

Mr. Hallberg.— My experience is more of a commercial nature. I think the percentage of milk-sugar obtained, one and three-fourths per cent., as stated in this communication to Mr. Lemberger, is entirely too low, and its manufacture would not pay commercially at this yield of the product. From twenty gallons of sweet whey I obtained nearly ten pounds of milk-sugar in three successive crystallizations. The whey, when evaporated to about three-fourths of its original bulk, separated a great quantity of casein, and this is taken advantage of in some localities,—Sweden, for instance,—where the cheese thus obtained is greatly relished. This could be taken advantage of at the cheese factories, where the cheese thus obtained would more than compensate for the labor, and the decreased bulk of whey would reduce the freight and prevent the whey from fermenting. In this condition it could be more economically shipped to the places where the manufacture of milk-sugar is carried on. The result of the first crystallization was about three pounds of milk-sugar, of a lemon-yellow color, which seemed pure, and free from foreign taste and odor. Upon further concentration of the mother-liquor it left, upon standing, about the same amount as previously obtained. This sugar was somewhat darker in color and less free from odor and foreign taste. By evaporating carefully the remaining liquor, a dark body was obtained, having considerable foreign matter and a very cheesy odor and taste. A small portion of this boiled down with animal charcoal, and filtered, yielded only a small amount of white milk-sugar. I would like to ask Mr. Lemberger if he is familiar with the process used in crystallizing this milk-sugar he exhibits?

Mr. Lemberger.—I have no more knowledge than that paper gives me; the writer tells us exactly how he does it.

Mr. Hallberg.—I found that the animal charcoal absorbed quite a percentage of the milk-sugar when I tried purification.

Mr. Ebert.—It must have been something else instead of milk-sugar that the bone-black absorbed. If the charcoal was properly purified, the percentage of saccharine matter it would hold absorbed would be very slight. Nearly all of it could be washed out by the use of water. By boiling the sugar solution with animal charcoal, and allowing the liquor to drain off, you would lose a large amount of milk-sugar; but if the solution was run through the charcoal in properly constructed filters, there would be very little loss of the sugar, especially if perfectly washed out by water.

Mr. Hallberg.—I would like to add, in conclusion, that in a conversation with Professor Delfontaine, of Chicago, who has visited the milk-sugar refineries in Switzerland, I was told that milk-sugar is manufactured in Switzerland in a very crude manner, the only apparatus used being large wooden vats, in which concentrated whey is left to crystallize for two or three months. This is favored by the introduction of sticks of wood, and sometimes twine.

A Member.—Goats' milk is used in this country on account of the greater percentage of sugar contained in it.

Mr. Lemberger.—There seems to be considerable trouble in getting rid of the casein and some other matters.

Mr. Remington.—Before I came to this meeting I was informed that the makers of condensed milk, of which there are quite a number now in the country, had a process of extracting the sugar of milk from the concentrated condensed milk and substituting in its place cane-sugar. I know that cane-sugar is present in condensed milk. I was told that they had a method of extracting the sugar of milk from condensed milk. I want to ask Mr. Hallberg and Mr. Lemberger whether they have ever heard of any such plan of extracting the sugar of milk from the condensed milk and replacing it with cane-sugar?

Mr. Ebert.—Some four years ago one of these manufacturers of condensed milk came to me and wished to know what I could suggest as to getting rid of the crystallization of the sugar of milk and do away with adding cane-sugar to it. At that time, being engaged in the glucose business, I thought I might turn an honest penny. I advised this gentleman to add a certain percentage of glucose instead of cane-sugar, as it would make a better preparation and likely prevent the crystallization of the milk-sugar. He paid me my fee as an expert, but he did not order any glucose subsequently.

Mr. Vogeler.—I am acquainted with a physician, in Chicago, who has been experimenting with the making of sugar of milk and could not make it pay. What he most complained of was the coloring-matter which almost all manufacturers of cheese have to use.

Mr. Ebert.—Mr. Vogeler refers to coloring-matter. One of the manufacturers stated to me that he could not bother with making sugar of milk because the whey was colored, as most of the consumers of cheese wanted a rich yellow color and they had to use coloring-matter. The American Milk Product Company say that they will be prepared to furnish sugar of milk at the close of six months for thirty-five cents a pound.

Mr. Kennedy read a paper on Jaborandi, its Fluid Extract and Alkaloid (see page 421), and exhibited specimens of the preparations. The paper was written in answer to Query 22.

Mr. Saunders.—At a late meeting of the American Association for the Advancement of Science there was a paper read on Philocarpina, in which it was stated that in several instances white hair had been changed to dark by the use of this alkaloid. I would like to know if any member has any knowledge on that subject.

The President.—Has any one here heard of hair-dye being taken internally?

Mr. Menninger.—If hair is turned dark, the presumption is that the skin will ultimately assume a similar color.

Mr. Kennedy.—I have a small quantity of philocarpina in the form of an extract. A week or so after it was prepared I observed some crystals, which I thought were due to chloride of sodium. I redissolved it in ether and then evaporated it, obtaining a thick mass, but no crystallization took place for some time. However, I found, on taking this tube containing it out of my trunk, that it contains some crystals. I don't believe the crystals can be chloride of sodium, because the alkaloid had been treated with chloroform and ether. You will observe that the little crystals are on the side of the tube.

Mr. Hallberg stated that he had observed a reaction of the alkaloid which might possibly be of value. If test-paper is impregnated with an acid solution of philocarpina and then exposed to ammoniacal vapors, the production of a green color was observed.

On motion, the Association adjourned until Thursday morning at 10 o'clock.

Fourth Session.—Thursday Morning, August 25th.

The meeting was called to order by the President at 10.20 o'clock, when the minutes of the Third Session were read and approved.

The minutes of the Council were also read and approved. By these minutes the Association is informed that the Treasurer's Report had been audited by a committee of the Council; that the Chairman of the Council and the Permanent Secretary had been appointed a Committee to Devise and Report a Plan for the Proper Application of the Interest Derived from the Centennial Fund; that the vouchers of fourteen candidates for membership, whose names were read, had been examined, and that the following gentlemen, whose applications were reported at the Second Session, had been duly elected members:

Alabama.

Thomas Jameson Savage, Mobile.

Illinois.

Lorenz Blahnik, Chicago.
Emil Hamilton, Chicago.
Charles F. Hartwig, Chicago.
Hugo W. C. Martin, Chicago.
C. Herman Plautz, Chicago.
Charles Zimmermann, Peoria.

Indiana.

Wm. Jonathan Earnshaw, Indianapolis.

Iowa.

Abner Theod. Birchard, Marshalltown.
William W. Ennis, Ottumwa.

Massachusetts.

Max Cramer, Boston.
David P. Grosvenor, Jr., Peabody.
William E. Luscomb, Salem.
Frederick Reed, Natick.

Michigan.

Charles F. Bigelow, Evart.

Missouri.

Henry Clay Arnold, Kansas City.
James M. Ford, Kansas City.
Philip H. Franklin, Marshall.
Eugene L. Fridenberg, Kansas City.
Gilbert D. Gray, Glenwood.
Harry W. Harper, Boonville.
John W. O'Brien, St. Louis.

New Hampshire.

George Jones Hubbard, Manchester.
George Edward Lull, Manchester.

New York.

Charles Dyer Chase, New York.
Albert Ladd Colby, New York.
Ed. L. Davis, Schenectady.
William Augustus Dieterich, New York.
Charles H. Gardner, New York.
Chas. Henry (Dworniczak), Croton Land'g.
George E. Hopper, Hume.
Albert H. Lins, New York.
Charles Smither, Buffalo.
Thomas Stoddart, Buffalo.
Frederick Wichelus, New York.

Ohio.

Samuel Chance, Saint Paris.
Joseph C. Elfers, Cincinnati.
Willis H. Graham, Zanesville.
C. Joseph Lammert, Cincinnati.
C. Wes. Lyon, Spring Valley.
William J. Martin, Cincinnati.
Albert Meininger, Cincinnati.
Louis Clark Pettit, New Lisbon.
Charles Wilson Phillips, Cincinnati.
Leo S. Schreck, Cincinnati.
F. Schuerman, Cincinnati.
John C. Schwartz, Hamilton.
Hermann Vilter, Cincinnati.
Harry C. Walton, Cincinnati.

Ontario.

William Orville Foster, Simcoe.
Stuart William Johnson, Toronto.

Pennsylvania.

Charles M. Driggs, White Haven.
J. H. Redsecker, Lebanon.

Wisconsin.

Bartholomew Bantly, Milwaukee.
Adam Cowrath, Milwaukee.
Frederick Robinson, Kenosha.
Charles C. Sniteman, Neillsville.

The Report of the Treasurer is as follows:

To the Council of the American Pharmaceutical Association.

Gentlemen: As directed by the Constitution and the practice of former years, I herewith present a report of my transactions during the past year. All the bills of which I am cognizant have been paid, and there is a balance in the Treasury of $1627.06. This balance does not include the Ebert Fund of $500, the Centennial Fund of $1117.81, and the Life Membership Fund of $605, which are invested, agreeable to your directions, in registered Government bonds. This balance would have been larger if the meeting had not been held at an earlier date than in previous years. The agents in several cities have informed me they will soon remit their collections.

I have received notice of twelve resignations, and there are now on our books the names of ninety-two members who are liable to be dropped for non-payment of dues. Fifteen members resigned last year, and sixty-seven members were dropped for non-payment of dues. I have the pleasure to report that two of the members who resigned have written they will resume their membership, and three who were dropped have made good their membership by paying up their arrearages.

Death has been busy in our ranks the past year, and some of our old and valued members have been taken from us. In the list are not only the members of many years, but also those whose names have but once appeared upon our list of members. The admonition "Be ye also ready" comes to us at this time with peculiar distinctness. I have communicated the facts known to me of our deceased fraters to the Council, who will place them upon our records.

Within the past two years forty-four persons have ceased to be members who have not returned their certificates. Each of them has been requested to do so by letters addressed to their last known place of residence. I have given the list of names to the Council, as required of me by the By-laws. I have the pleasure to report that twelve members have paid the amount required to become life members, and other members inform me they have the subject under consideration.

My correspondence for the past year has been largely increased, and the labor performed is double what it was five years ago. Being actively engaged in business, I cannot always answer letters as promptly as I could wish. I would request the members kindly to allow me as much time for answers as their patience will allow, as all letters shall receive attention as early as possible. Considering the large number of letters sent the Treasurer, but few have miscarried. More often they are missent, and finally arrive at their destination. As there are twenty-two other places of the same name as his little city, the members will oblige him by writing New Hampshire in full on all the letters sent him.

There are many members of our Association with whom the Treasurer has had most pleasant official intercourse within the last sixteen years. Their handwriting is as familiar to him as household words, yet he has never seen them face to face, and has no means of recognizing them should he meet them. He takes this opportunity to express his grateful acknowledgment of their kind expressions of goodwill, and the hope, should he ever meet them, they will make themselves known to him.

Thanking his brother officers, the authorized agents, and the members for the pleasant intercourse of the past year, I respectfully submit this report.

Statement of the Receipts and Disbursements of the American Pharmaceutical Association for the year ending August 15th, 1881.

1881.	RECEIPTS.	
Aug. 15.	To balance on hand as per last report,	$1561 61
	Amount received for yearly contributions previous to 1881,	2560 00
	Amount received for yearly contributions for 1881,	1135 00
	Amount received for memberships,	725 00
	Amount received for life memberships,	190 00
	Amount received from the sale of Proceedings,	136 50
	Amount received from the sale of certificates,	470 00
	Amount received from the friends of William B. Chapman,	38 50
		$6816 61

1881.	DISBURSEMENTS.		
Aug. 15.	By cash paid for the expense of the Proceedings, viz.:		
	Sherman & Co., printing,	$1565 06	
	William Rutter & Co., binding,	307 20	
	Charles H. Sturges, stenographic report,	80 00	
	F. Gutekunst, photographs,	82 00	
	C. Lewis Diehl, salary as Reporter on the Progress of Pharmacy,	500 00	
			$2534 26
	Cash paid for certificates:		
	American Bank Note Company,		69 00
	Cash paid for expenses:		
	John M. Maisch, salary,	600 00	
	Cash paid for miscellaneous expenses, including expense attending the meeting at Saratoga, printing, stationery, freight, expressage, packing-boxes, and postage,	328 07	
	Charles A. Tufts, salary,	500 00	
	Cash paid for miscellaneous expense, including expense attending the meeting at Saratoga, printing, filling out certificates, and expenses of collectors in cities,	242 43	
	Charles F. Fisk, expenses of the meeting at Saratoga,	219 17	
	George W. Kennedy, expenses as Chairman of the Executive Committee, printing, freight, and postage,	58 37	
	P. Wendover Bedford, expenses of the Committee for New Members,	50 00	
	J. T. P. Averill, printing for the Committee for New Members,	43 25	
	German Insurance Company, insurance on the property of the American Pharmaceutical Association, stored in the Philadelphia College of Pharmacy,	15 00	
			2056 29
	Life membership fund,		530 00
	Balance to new account,		1627 06
			$6816 61

CHARLES A. TUFTS,
Treasurer.

The following invitation was read, and accepted with thanks:

To the President and Secretary American Pharmaceutical Association:

Please extend a public invitation to all of your friends to come to the "Journal" office and see our new press in operation for one hour.

Signed, A. J. Beethine.

Kansas City, August 25th, 9.40 a.m.

The proposed Amendments to the By-laws being called up for action, that proposed by the Council was read, adding to Chapter viii, Article iii, the words: "which sums shall accompany the application." It was explained that the adoption of the amendment would require each application to be accompanied by ten dollars; that is, five dollars each for initiation fee and the dues for the current year, which sum would be returned in case the candidate was not elected. The amendment was adopted unanimously.

The amendment offered by Mr. Markoe at the First Session (see page 490) was next considered. Mr. Markoe explained that the object was that the President elected at the meeting should preside beginning with the last session of the meeting at which he was elected and during the whole of the following meeting except the last session, at which his successor would enter upon his duties. The Secretary opposed the amendment, which had been rejected by a large majority at the Indianapolis meeting, and would be liable to defeat its avowed purpose of having the President prepared for his duties, inasmuch as this officer might be prevented from attending the next meeting, as happened in 1867, in consequence of sickness; or, as was the case at the present meeting, in consequence of urgent duties at home; or, the Association, at the beginning of the meeting, might find itself without President or Vice-Presidents, as happened in 1871, when one Vice-President was deceased and the remaining two and the President were absent for various causes. For these reasons the Permanent Secretary moved the indefinite postponement of the amendment, which motion was carried by a vote of 53 ayes against 16 nays.

Mr. Dohme read a volunteer paper on Soluble Ferric Phosphate (see page 434), which was accepted and referred.

Mr. Remington.—I would like to ask Mr. Dohme whether he has kept any of this salt for some length of time, and whether he has had any experience as to its permanency?

Mr. Dohme.—I have not had the salt made for any great length of time. I suppose the oldest specimen I have is about five months old, and it was found fully as soluble at that time as when it was made. Ferric phosphate combined with citrate of sodium makes quite a soluble salt.

Mr. Maisch.—Does Mr. Dohme or any member present know whether phosphate of iron, rendered soluble by the addition of citrate of ammonium or of sodium, has any advantage over pyrophosphate of iron rendered soluble in the same manner?

Mr. Dohme.—I am not ready to speak of the therapeutical value of it in comparison with pyrophosphate; it is a fact that solutions of phosphate of iron are in use, and it would be convenient to have a soluble phosphate; whether it is better than the pyrophosphate I am unable to say.

The President announced that two members of the Committee on Exhibition, owing to indisposition, request to be relieved, and that he would reconstruct the committee by appointing Messrs. J. D. Wells, of Cincinnati; T. Roberts Baker, of Richmond, Va.; W. S. Thompson, of Washington, D. C.; C. A. Weaver, of Des Moines; and J. H. Wilson, of Chicago.

Mr. Stuart read a paper on the histology of the roots of Apocynum androsæmifolium and A. cannabinum, in answer to Query 6, and exhibited the two drugs and microscopical drawings of the same.

Mr. Maisch.—I would dislike very much to have such an interesting paper read before the Association without some remarks on the subject. Personally, I am obliged to Mr. Stuart for this very interesting investigation. I have been personally interested in the matter, and can testify to the correctness of most of these statements from my own personal observations. Years ago, when making a collection of our indigenous drugs, I observed the rhizomes of these two species as they are met with in the market to be completely indistinguishable from each other, and I determined to ascertain whether the two were indeed so nearly alike. I dug them myself, and found that the two plants have roots which are very easily distinguished from each other. A few years ago I wrote to Mr. Lloyd, and asked him to send me some androsæmifolium. That was the first time I received a distinct specimen of it identical with that which I had dug myself. The points of distinction which have also been recently investigated by Mr. Manheimer, a student of the Philadelphia College of Pharmacy, are so clearly marked that they cannot be mistaken. Androsæmifolium has bast fibres or stone-cells in the bark, a thin pith, and on breaking has a tough wood. Cannabinum has no bast fibres, a thick pith, and breaks with a very short fracture. By the physical characteristics the two drugs can be very easily distinguished.

Mr. Lloyd.—I would ask the members of this Association if any of them have ever found androsæmifolium in the market? I have not been able to find specimens sold upon the market. In Cincinnati we have had to send to a distance to get even specimens of this plant. It does not grow there. I wish to ask if any one has ever met any androsæmifolium in its true form in the market under any name?

Mr. Saunders.—Androsæmifolium is very abundant in the section of Canada I come from. It grows everywhere. The supplies I have used I have had collected in the neighborhood, and have had no difficulty in obtaining the genuine article. I would suppose it would be as common in Ohio as with us.

Mr. Lloyd.—I have not been able to obtain it in the market for manufacturing and other purposes. It seems that this must be gathered by a certain class of people.

Mr. Maisch.—Androsæmifolium is chiefly a northern plant, while cannabinum is also found further south. Asa Gray refers to both as common, without stating the area where they are found. In the neighborhood of Philadelphia androsæmifolium is rather scarce and cannabinum is quite common.

Mr. Lloyd.—I understood at one time there was a patch of androsæmifolium in

Indiana. My brother went there for the purpose of collecting it, but he could not find a single specimen.

Mr. Markoe read the following report* of the Committee on the Vice-President's address, which was accepted.

The committee appointed to consider the recommendations contained in the address of the first vice-president have carefully considered the several points, and report as follows:

Upon the recommendation "to secure all the influence possible to the end that the obnoxious retail liquor dealers' license be abolished," your committee expresses its full assent.

That pharmacists, as represented by this body, should take sides upon the question of temperance in any way, there are good grounds for doubt.

In many respects the proposition, "that a conference committee be constituted to confer with the American Medical Association" with reference to holding a joint meeting, is well worthy of consideration by this Association, but your committee believe that a more successful meeting would result if the invitation emanated from the senior organization. At the present time it seems, in the judgment of your committee, impracticable to move in the matter.

George F. H. Markoe,
James P. Remington,
William H. Crawford.

Mr. Llewellyn.—In regard to liquor dealers' license, there is no reason why the retail druggists should not pay the license which the government requires. We are, in a certain sense, retail liquor dealers. It is very bad policy for us to object to the payment of the license because we want some relief on the tariff. If we ask all we will be apt to get nothing. The relief from the license is very small when compared with relief on the tariff.

Mr. Ebert.—I agree with the gentleman. I do not consider it a disgrace that we are retail liquor dealers. The disgrace is not in what we are called, but in what we do. If we wish to elevate ourselves let us stop the tippling that is going on in many drug stores. If you must sell liquor for medicinal purposes, sell it for such purposes only. Adopt a rule that not a drop of liquor shall be drunk on your premises. If it is necessary that people must have liquor to take to their homes, as you are a liquor dealer, sell it to them. You cannot make people better than they are. You cannot prevent them from drinking, but you can prevent them from drinking at your counter. There is no need of our getting any relief from the government. It is well known that certain stores are whiskey shops instead of drug stores, and thereby disgrace the profession. The next argument made in our Vice-President's address is in regard to the stamp act. It is very burdensome for us to attach a stamp to every sale that we make of some trifling proprietary article, and I would like to see a modification in this direction. If we sell five or ten cents worth of cologne we have to put a stamp on the bottle each time.

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* The report contained also remarks on the subject mentioned in the foot-note on page 484. After some discussion, it was ordered that all reference to this subject be erased from the minutes.—Secretary.

Mr. Maisch.—I don't like it to appear as if the committee had recommended an indiscriminate repeal, or relief from the liquor dealers' license. Such is not the case. They intimate merely, and I wish they had expressed it more strongly, that those who confine their sales of liquors strictly to medicinal use should be relieved. The difficulty is in drawing the line.

Mr. Markoe.—I don't think that pharmacists can be relieved from the United States liquor tax. It is a tax for revenue, and not for prohibition. I think pharmacists have a right to complain in regard to such laws as make no distinction between pharmacists and ordinary liquor dealers. In Massachusetts, after a great deal of trouble, we have arrived at a solution of the difficulty. There are six different classes of licenses,—that of the manufacturer, the wholesale dealers, etc., and the last class is that of the druggists. The druggist is a liquor dealer of the sixth class. . The druggist files a bond for two thousand dollars, indorsed by two responsible citizens, pays one dollar for registration, and sells for medicinal use upon the written requisition of the party wanting it. The requisition gives the name and residence of the party. By complying with this simple provision we are relieved of the onerous tax which was levied upon us in former times when there was no distinction made between the druggist and the man who kept a bar. I think if the pharmacists would go to the legislature, and ask to be made a special class of liquor dealers, it would result in benefit to all. A similar law has been in operation in Rhode Island.

After some remarks by Mr. Leis on the proposed excursion to New Mexico and Colorado, and by Mr. Ford, the agent of the Union Pacific Railroad, the Association, on motion of Mr. Cowdrey, seconded by Mr. Menninger, adjourned until 2 o'clock p m.

Fifth Session.—Thursday Afternoon, August 25th.

President Bedford called the meeting to order at 2.30 o'clock.

The minutes of the fourth session were read and approved. The following telegram was also read by the Permanent Secretary and referred to the Committee on the next Annual Meeting:

John M. Maisch, Secretary American Pharmaceutical Association: In the name of the members of the Association and druggists of Detroit I hereby tender the Association a cordial invitation to hold next meeting in Detroit.

James Vernor.

Detroit, Mich., August 25th.

The minutes of the Council, which were read by Mr. Kennedy, inform the Association of the application for membership of two gentlemen, whose vouchers had been examined by the Council, and of the election of the following new members, whose applications had been reported at the fourth session.

Illinois.

Percival Brewer, Roseville.
Charles E. Button, Chicago.

Iowa.

Arthur James More, Sioux City.

Kansas.

Oscar Seitz, Salina.
W. A. Standford, Florence.

Minnesota.

John Roger Jones, Mankato.

Missouri.

Amos Henry Coffee, Carthage.
O. N. Garrett, Cameron.
Francis Hemm, South St. Louis.
John E. Sombart, Boonville.
Ferdidand G. Uhlich, St. Louis.

Wisconsin.

Augustus E. Bates, Menasha.
Frank S. Fenton, Beloit.
D. C. Griswold, Evansville.

Mr. Griffith read a paper on Emulsions of Cod-liver Oil (see page 429) in answer to Query 19, and exhibited samples of the preparations made by the formulas reported.

Mr. Allaire read a paper on the Pharmaceutical use of Grape-sugar in the place of Cane-sugar (see page 405), in answer to Query 12, and exhibited numerous samples of glucose and of syrups made with it.

Mr. Ebert.—In chemistry the terms "glucose" and "grape-sugar" are synonymous, the first being the scientific and the latter the common name for this saccharine substance. But the term glucose, as it is commercially used in this country, applies to a syrupy liquid composed of various proportions of grape-sugar and dextrin. This improper name was bestowed upon this syrup when it was first brought to this country by the importer, to avoid the high duty existing upon refined syrups. In Great Britain this syrup is known as "dextrose" or "dextrin" syrup; in France as "syrup imponderable;" in Germany as "dextrin syrup" and "stärke syrup."

Sugar refiners in this country make the public statement that they use no glucose in adulterating their sugars, which, if they refer to this syrupy liquor, is without doubt truthful; but it is not so true if we take the chemical version into consideration.

The President.—Will Mr. Ebert make further explanation as to the difference between dextrin syrup and grape-sugar.

Mr. Ebert.—In the conversion of starch by the use of acid and heat, the first step in the process is the starch changing from the insoluble to the soluble state; the next change is that into dextrin, and if the action is continued the product will be glucose or grape-sugar. Much depends upon the percentage of acid, the amount of heat, and the length of time employed to produce the desired article. The dextrin syrup or glucose, as commercially so called, consists of about 40 per cent. of sugar and 60 per cent. of dextrin, while the solid glucose or grape-sugar consists of 80 per cent. of sugar and 20 per cent. of dextrin. The substitution of grape-sugar for cane-sugar in pharmacy fails on account of less sweetness and the less solubility of grape-sugar, which, on this account, would not remain in solution if we were to prepare a syrup of grape-sugar having the specific gravity of 1.317, which is that of simple syrup of the United States Pharmacopœia. Regarding the wholesomeness there can be no objection to it. The only foreign substance commercial grape-sugar contains is a little sulphate of lime, which may be present to the amount of from one-third to one per cent.

The President.—I would like to ask whether it is possible to remove sulphate of lime entirely?

Mr. Ebert.—Yes; all that is necessary would be to add oxalate of ammonia, which would remove it when lime was used in the process of neutralization of sulphuric acid. It is, however, not essential to employ lime, barium salts can be employed for this purpose.

The President.—I asked the question because I have been informed that sulphate of lime could be so entirely removed that there would be no trace of it present.

Mr. Ebert.—I cannot see what objection there can be against such a small quantity of sulphate of lime. Refined cane-sugar is hardly ever free from a small percentage of lime, and we never hear of any complaint on this account regarding the purity of the sugar.

Mr. Remington.—I would like to ask my friend Ebert if he is willing to tell the Association why it is that so much glucose in the market smells of sulphurous acid?

Mr. Ebert.—Whenever the process is done on an economical plan, that is saving in the expense of using the proper quantity of animal charcoal, for the proper purification of the saccharine solution, then the bleaching properties of sulphurous acid gas are employed frequently during the time the liquor is being evaporated in the vacuum pan, and also frequently just previous to finishing the product. Solutions of the bisulphites of lime and soda are added to give the product a lighter appearance. For many purposes a sugar impregnated with sulphurous acid, or its salts, seems desirable. This is true for the use of the confectioner and all such uses where the grape-sugar or glucose is to be subjected to a long-continued boiling heat. Grape-sugar is decomposed by contact with alkalies, alkaline earths, and some metallic oxides, forming glucic acid. This is avoided when free sulphurous acid is present. Any foreign odor present in the sugar or syrup is due to a faulty process. Dextrin is not made by this process, but it is made by the roasting of starch, or by moistening starch with an acid, usually nitric acid, and then subjecting to a dry heat in ovens.

Mr. Sloan read a paper on Solutions of Chemicals for Convenience in Dispensing, in answer to Query 1 (see page 404).

Mr. Kennedy.—I believe, in some cases, a solution of the alkaloid strychnia would be desirable to have on account of the nux vomica varying considerably in strength. Physicians have sometimes complained that they have failed to promptly obtain the effects of strychnia; and in other cases that nux vomica preparations were too powerful. I prepared an elixir containing one grain of strychnia in every 120 drops, and dissolved in a diluted acid. I believe such a preparation would be more desirable on account of the alkaloidal strength of nux vomica varying so much.

Mr. Menninger.—I recollect that one of our members, at a previous meeting, read a paper in which he suggested that dispensing pharmacists keep various ferric salts in solution ready for dispensing. I would like to ask whether any gentlemen have had any experience with those preparations as recommended.

Mr. Ebert.—Five or six years ago I had an unusual experience of that kind. I think it was at the suggestion of that paper that I prepared a large number of these preparations in solutions. Among them was citrate of iron and quinine. I dispensed it very freely. Towards the last, when the quantity that I had made was nearly exhausted, a prescription that had been previously dispensed was repeated. It was shortly after returned to me with a statement that there must be some mistake about it, that the medicine produced a different effect from what it had formerly produced. I questioned the patient, and he told me that it had produced a most terrible griping and diarrhœa, and he said he thought there must be something wrong about the medicine. Not having dispensed it myself, and being unable to explain the difficulty complained of, I put up the same mixture. The patient took a dose of it at night, and the physician came to me in the morning and told me that there must certainly be something the matter with the medicine that I had put up, that it was producing very serious effects. I at once took a dose of it myself, and such agony as I suffered for the next twenty-four hours I am unable to describe; and I firmly came to the conclusion that there must be something wrong. I made a microscopical examination and found that it had undergone some decomposition. A fungoid growth seemed to have developed, which was visible by the aid of the microscope. I compounded the prescription again, using the dry salt of iron and quinine, and had no further complaint. From that time on I kept no more salts in solution.

Mr. Bullock —I think that is exactly the point that should be made in regard to these solutions. If the bottle is kept full and the air has no access to the contents nearly all organic acids will remain intact; but if a portion of the liquid is poured out so as to allow the air to get in, a change will take place. I am perfectly well satisfied that these solutions, which contain organic acids, can be kept intact in a bottle in which there is no stratum of air.

Mr. Stuart.—Some years ago I paid some attention to the fungoid growths referred to by Mr. Sloan. My attention has been drawn to it both from a pharmaceutical and a botanical standpoint: to the first as a practical problem concerning dispensers; to the latter, in reference to the species of mould to which the vegetation might be referred. Another point was the amount of alkaloid appropriated by the plant. In regard to the best method of preventing the appearance of the parasitic plant, I found it was effected in very nearly the same way, and by the same antiferments as yeast bacteria and the smaller fungi in general. Owing, however, to the loss of my notes by fire I cannot give definite figures. A somewhat careful study of the plant satisfied me that all the common moulds are represented among the submerged growths. It is only when this growth of the fungus extends above the surface that fructification takes place. Therefore, specimens were cultivated, due precaution being taken to exclude the spores of other moulds. Two or three genera only were ordinarily met, and these appeared to be in about the same relative instances as the normal forms, and were referable to penicilium, aspergillus, and mucor. The submerged plant seemed, under these circumstances, to increase by simple vegetation to an almost unlimited extent without ever bearing fruit. This growth seemed to take place by cell divisions. I observed something like a conjugation, but no record of such observations has met my notice after a search through the works on fungi, and I have not been able to demonstrate its nature fully. The task of determining the loss of alkaloid by this growth is quite difficult, and has not been satisfactorily accomplished. Some loss, however, must occur, as distilled water and air cannot furnish the carbon material necessary to the formation of the cellulose of the plant.

Mr. Ebert.—I think this would be a good subject for a query.

Mr. Saunders read a volunteer paper on Commercial Senega, by Messrs. J. U. and C. G. Lloyd (see page 453), which was accepted and referred. A large number of herbarium specimens and of senega roots were exhibited in illustration of the subject.

Mr. Maisch.—I have listened with a great deal of attention to that interesting paper. I have more than a usual interest in it, since for the last five years I have been paying attention to the very same subject. In 1876 Mr. Saunders first called attention to so-called white senega in the market, differing in some respects from the true senega. A lot which was subsequently found in the Eastern market was traced back to St. Louis. I hope that Mr. Crawford will give us the information that he obtained at that time about the origin of that senega that came from St. Louis.

Mr. Crawford.—I will state that Professor Maisch forwarded to me a specimen of senega from Philadelphia. I found the commission merchant in St. Louis who had shipped it. I investigated as to where he got it, and learned that he had it shipped to him from Springfield, Mo., and that it was gathered from the country surrounding that city. I tried to get a specimen of the plant, but was unsuccessful. From the appearance of the sample forwarded to me it seemed to be unlike the usual senega found in the market, having a lighter color, and being whiter and smaller than any of the samples here. It was straight, not wrinkled, and devoid of usual ridges found.

Mr. Maisch.—That senega, if that information was correct, and I have no doubt it was, that senega was certainly not obtained in the North. I understand that Springfield, where it was obtained, is in the southwestern section of Missouri, bordering on Arkansas and the Indian Territory, so that we would naturally be led to look South for a portion of the senega that comes into the market. There is no doubt that the false senega, as I have called it, agrees in many respects with the root of Polygala Boykinii, of which I have recently received a specimen from Alabama, and differs histologically from true senega, of which I have received many specimens from several of the Middle States, and which is always found with a keel or ridge running along the entire root. In this so-called false senega that ridge is absent, or, very rarely, in the top portion of the main root there is a slight indication of it. In the samples here I notice much larger roots, and a larger admixture of such which have the keel, than I have ever before seen in what I have called false senega. The keel is produced by the one-sided growth of the wood. In the false senega the wood was nearly circular, and on that account the keel is not formed. The so-called inner bark is absent, or only indicated as a thin layer; while in the senega as we have been in the habit of seeing it the inner bark is on one side, and it is that portion which produces the keel, because it shrinks less than the outer bark. There is such a marked difference in the development of the woody portion, and in the inner bark of the root, that one has a right to believe that the two must, no matter how closely related botanically, come from different species. Aside from others of minor importance, in the true senega we have the keel always distinct, in the false senega the ridge is absent or very indistinct. This difference was noticed by Mr. Greenish in the London "Pharmaceutical Journal" in 1878. Otherwise the histological elements of the two roots are so similar that little, if any, difference can be found, and that the origin of the two roots from closely allied species must be inferred. I wrote to Dr. Gunn, of Alabama, and he sent me one specimen of Polygala Boykinii, the root of which is smaller than the ordinary so-called false senega of the market. I do not know whether this plant is in its full state of development, whether it grows any larger or not; but it corresponds in its essential structure with that of false senega. The differences that are observable under the microscope are so slight as to be hardly noticeable. It is partly from the external appearance, but mainly from their structure, that I pronounced these two roots identical. I have not succeeded in obtaining the roots of other species. The varieties of senega exhibited here are of various grades, and in many roots the keel is quite prominent, even in the fresh state. If they are really identical with the white or false senega which I have seen in the Eastern market they should have a circular wood, and no inner bark, or only a thin uniform layer of it. They are derived from this Northern variety of Polygala senega, which, if there is such a difference in the structure of the root, should, I think, be regarded as a different species, and I should not be surprised if, on close investigation, the botanist would find differences in the flower and fruit aside from the variations in the leaves. The difference in structure is, in my opinion, so very marked, that I think if it is to be regarded merely as a variety, it is one of the most distinct varieties I have ever seen.

Mr. Lloyd.—I do not think you can form a species upon the size of the root.

Mr. Maisch.—Not the size, but the structure of the root.

Mr. Lloyd.—Let me call your attention to another point. Professor Watson, of Harvard, in his Index, neglected to recognize any but the integral species of senega. My brother wrote to him regarding it, and he answered that it was an oversight or a mistake on his part; that it was settled definitely that this should be called a variety. However, I do not think it admissible to recognize a species on account of the size of the leaves. We could take the root, and from that form another species, but not from the plant itself.

Mr. Saunders.—The root which attracted my attention some years ago was received from a dealer in New York. When I saw it it struck me that it was different from the ordinary root of commerce. You see the specimen I hold in my hand is wider at the base. By chewing the centre it will be found to be almost tasteless. It was the hard woody structure in the centre that attracted my attention. I found it to be very deficient in strength. After examining it I concluded that it would not make a preparation such as I wanted to supply my customers with, and I returned it. The dealer in New York wrote to me that he was surprised that I did not know good senega. He said that he had sold it in Europe at an advance over the ordinary price, and that it was shipped from the South. I never could succeed in getting that root afterwards, though I tried to get it in various ways. It certainly appeared to me at the time that it was a distinct species. Not knowing the contents of this paper when I read it I was surprised. I hope that the matter will be thoroughly investigated by Mr. Lloyd, and determined so that we may know that we are resting on safe ground.

Mr. Lloyd.—I have made arrangements to that effect. There is no species in the Northwest that will in any way answer the description we have as to any medicinal species. In regard to the centre of the root our friend Saunders is right, but I found the top to be quite as strong of taste as the outer part.

On motion of Mr. Menninger the paper was referred to the Committee on Publication.

A paper on Commercial Phosphate of Sodium, by Mr. Bedford, in answer to Query 27, was read by Mr. Remington (see page 433).

Mr. Stuart exhibited a large diagram, illustrating an instance of atavism in Cypripedium spectabile, observed by Professor Bastin. The paper prepared by this gentleman was brought to this meeting but was mislaid. On motion made by the Secretary, Mr. Stuart was requested to again procure a copy of the paper for publication in the Proceedings (see page 474).

Mr. Saunders read a volunteer paper by Mr. J. U. Lloyd, on Precipitates in Fluid Extracts (see page 408), which was, on motion, accepted and referred.

Mr. Saunders.—I think this paper throws a great deal of light upon a trouble that we have all had. I think Mr. Lloyd is entitled to the thanks of the Association for it.

Mr. Dohme—I move that the thanks of the Association be tendered to Mr. Lloyd for his experiments, and his paper, which he has contributed to this Association.

The motion was carried unanimously.

Mr. Hogin moved the following, which was likewise unanimously adopted:

Resolved, That the thanks of this Association are due, and are hereby tendered, to all those gentlemen who, by their untiring efforts, have obtained very low rates of fare from the different parts of the Union to Kansas City and return.

Mr. Hallberg read a paper on Powdered Extracts, in answer to Query 32 (see page 424).

Mr. Remington.—I regard this as a very valuable paper, and the experiments here detailed as of great value. I have a personal and individual interest in the experiments which Mr. Hallberg has developed. I have been at this subject for three years, and have expended a great deal of time upon it. The matter was brought up in a report in the Committee on the Revision of the Pharmacopœia, and it was afterwards adopted by the Committee on Revision. There is no question that Mr. Hallberg is right in making the finished extract bear a definite relation to the drug, and not a relation to the extract of commerce; for in this way he is very much more apt to secure a uniform preparation. The extracts of commerce have from ten to twenty, and sometimes as high as thirty per cent. of water, and are utterly unreliable on that account.

Mr. Remington read a paper by Mr. Covell, giving a formula for Spiritus Odoratus, or Cologne-water, which was accepted for publication (see page 407).

On motion of the same member Mr. R. J. Brown was granted time to finish a catalogue of the medicinal plants of Kansas for publication in the Proceedings (see page 438).

On motion of Mr. Menninger the report on the Progress of Pharmacy and the report on the Exhibition, when finished, were referred to the Council for publication.

The following communication was read:

Boston, Mass., August 8th, 1881.

J. U. Lloyd, Chairman of the Committee on Papers and Queries of the American Pharmarceutical Association.

Dear Sir: In regard to the eleventh in the list of queries to be answered at this year's meeting, which some one else did me the honor last year to accept in my name, I have to report as follows: That the extensive article by Dr. F. Clausnizer, upon the various methods of estimating glycerin, published in the first number of the "Fresenius' Zeitschrift für Analytische Chemie" for this year, 1881, seems to have answered the query for me. The most important portions of this article have been reprinted in "New Remedies," for April and May, 1881. This, supplemented by the methods published by Professor A. B. Prescott in "New Remedies," for December, 1878, and by Professor A. H. Allen, in his recent work on "Commercial Organic Analysis," would seem to give satisfactory methods for the estimation of glycerin in pharmaceutical preparations.

Yours very respectfully,

B. F. Davenport.

On motion of Mr. Cowdrey, the following resolution was adopted:

Resolved, That the Council be directed to use such means as may be deemed proper for increasing the membership of the Association, and that they take such measures as to them may seem best.

Mr. Saunders read the following report of the committee appointed to consider the subject of the next place of meeting:

KANSAS CITY, Thursday, August 25th, 1881.

Your committee having carefully considered the invitations submitted to them, as well as the claims of other sections, would respectfully recommend that the next meeting of the Association be held at Niagara Falls, beginning the second Tuesday of September, 1882.

Signed,
WILLIAM SAUNDERS,
CHARLES HUSTON,
WILLIAM H. ROGERS.

The report was, on motion, adopted, and Mr. Hiram E. Griffith, having been nominated Local Secretary, the President was directed to deposit an affirmative ballot for the nominee, which having been done, Mr. Griffith was declared duly elected to that office.

The following report was read, accepted, and referred:

LIST OF QUERIES

Accepted at the Twenty-ninth Annual Meeting.

QUERY 1. What are the best menstrua for use in making liquid vesicant and rubefacient preparations of Cantharides?

Accepted by George W. Sloan, Indianapolis.

2. Oil of Thyme of commerce is said to be very often deprived of its thymol. Is this statement true?

Accepted by Joseph L. Lemberger, Lebanon, Pa.

3. Lead plaster and other plasters of the United States Pharmacopœia get hard and brittle by keeping. How can their soft consistence, as when freshly made, be preserved?

Accepted by Hugo W. C. Martin.

4. It has been asserted that some pharmacists pay a percentage to physicians who send prescriptions to their stores. Is this true to any great extent? What is the feeling of the pharmacists of our country regarding the matter, and the feeling of physicians?

Accepted by Hugo W. C. Martin.

5. Examine and report upon the Creasote occurring in the American market.

Accepted by P. W. Bedford, New York city.

6. Examine and report upon the Tannates of Quinine of commerce.

Accepted by Charles F. Hartwig, Chicago.

7. Mixtures of Ferrocyanide and Carbonate of Potassium with Oxide or Oxalate of Iron have been recommended by Morgan (1854) and Zaengerle (1857) for the prep-

aration of reduced iron. Can a good article of reduced iron be readily obtained by such or other process which would dispense with the use of hydrogen?

Accepted by E. S. Wayne, Cincinnati, Ohio.

8. Are commercial volatile oils adulterated to any extent? What is generally used as the adulterant?

Accepted by W. H. Crawford, St. Louis.

9. Ethereal oil of male fern deposits a sediment. Is the sediment or the overlying oil the desirable portion?

Accepted by Charles F. Hartwig, Chicago.

10. It is desired to ascertain the solubility of the officinal chemicals in alcohol of the specific gravity 0.941 at 15.5° C. = 60° F. and at its boiling-point. The method of examination should be stated.

Continued to P. C. Candidus, Mobile, Ala.

11. The alkaloid Berberine is by some writers claimed to be nearly insoluble, while others claim it to be freely soluble in water. This discrepancy in statements should be investigated.

Accepted by T. L. A. Greve, Cincinnati, Ohio.

12. It has been asserted that much difficulty has been experienced in cultivating some species of medicinal plants, owing to the failure of the seed to germinate. Would any special treatment of such seeds facilitate their germination?

Continued to William Saunders, London, Ont.

13. The bark of Rhamnus Purshiana contains a substance that is said to strike a red color with ammonia. What is this principle?

Continued to N. Rosenwasser, Cleveland, Ohio.

14. The history of Rhamnus Purshiana.

Continued to James G. Steele, San Francisco, Cal.

15. How do the commercial Bismuth preparations compare with the requirements of the United States Pharmacopœia?

Continued to P. W. Bedford, New York city.

16. Is the yellow principle of Berberis Aquifolium root identical with Berberine?

Continued to Frederick B. Power, Philadelphia.

17. What menstruum is best adapted to extract and hold in solution the desirable principles of Licorice-root?

Accepted by F. F. Prentice, Janesville, Wis.

18. What is the crystalline form of the white alkaloid of Hydrastis Canadensis (Hydrastia)? What is its formula?

Continued to Frederick B. Power, Philadelphia.

19. What percentage of the more important powdered drugs, ordinarily obtainable in the market, are of a reliable character and suitable for dispensing purposes?

Accepted by Charles B. Allaire, Peoria, Ill.

20. Describe the structure of the different varieties, or species, of Senega of commerce. It is particularly desirable that a thorough microscopic examination be made of the roots of authentic specimens of Polygala Senega and its varieties, and of Polygala Boykinii.

Accepted by E. B. Stuart, Chicago, Ill.

21. What is the alcoholic strength of the fluid extracts of commerce?

Accepted by Adam Conrath, Milwaukee.

22. Is Bitter Almond water as reliable as Cherry Laurel water? Should pharmacists feel at liberty to substitute the one for the other?

Accepted by P. C. Candidus, Mobile, Ala.

23. Is there any difference in the laxative properties of Rhamnus Purshiana bark and the bark of Rhamnus Frangula?

Accepted by E. S. Wayne, Cincinnati, Ohio.

24. What is the quality of the narcotic herbs of commerce?

Accepted by C. S. Hallberg, Chicago.

25. What is the strength of commercial Mercurial Ointment?

Accepted by George W. Kennedy, Pottsville, Pa.

26. What is the percentage of Hydroxide of Potassium in commercial white caustic potash?

Accepted by Adolf G. Vogeler, Chicago.

27. What is commercial Musk?

For general acceptance.

28. Is the Sulphate of Quinine imported into this country and sold in bulk equal to that of our manufacturers?

For general acceptance.

29. What difference is there in therapeutic usefulness between Citrine Ointment, United States Pharmacopœia, and an ointment made by simply mixing the proper quantities of solution of Nitrate of Mercury with the officinal proportion of fat and oil without applying heat?

Accepted by Adolf G. Vogeler and C. S. Hallberg, Chicago.

30. What is the average amount of caffeine in the Guarana of commerce as compared with that of the seed? Determine a rapid and pharmaceutically correct method for getting at the percentage of caffeine. Give the most desirable alcoholic menstruum that is adapted to the extraction of caffeine and the preparation of fluid extract of Guarana.

Accepted by J. H. Feemster, Cincinnati, Ohio.

A recess of five minutes was taken to allow the Council to examine the vouchers of several applicants for membership. On reassembling, the Secretary of the Council reported the names of eight candidates, who, together with those previously reported, were subsequently elected by the Council, as follows:

Illinois.

Robert C. Hattenhauer, Peru, Lasalle County.

William Pitt Plummer, Bradford, Stark County.

Kansas.

Neil A. McCallum, Strong.

Edwin Morton Plummer, Sterling, Rice County.

Henry Solomon Plummer, Sterling, Rice County.

Michigan.

George D. MacKimmie, Detroit.

Missouri.

Othniel Beardslee, Odessa, Lafayette County.

Jackson J. Young, Kansas City.

New York.

John F. Munger, Greenbush.

North Carolina.

John Haywood Hardin, Wilmington.

The following resolutions were offered by Mr. Ebert, duly seconded, and passed unanimously:

Resolved, That the thanks of the Association are tendered to the retiring officers of the Association for their efficient services during the past year.

Resolved, That the thanks of the Association are hereby tendered to the Local Secretary and Local Committee for the management of the details connected with our meeting, and to these gentlemen and the citizens of Kansas City for the courteous treatment and hospitality extended to the visiting members and their ladies.

Resolved, That the thanks of the Association are hereby tendered to the Press of Kansas City for the full and accurate reports of our daily proceedings.

Statements were made concerning the arrangements for the proposed excursions to Colorado and to New Mexico, after which Mr. Seabury rose and said:

Mr. President and Gentlemen: Yesterday, when the question was introduced, it paved the way for an allied discussion of some importance. The subject of sustaining our entertainment expenditures is by no means a novelty. This theme is one that has been introduced in this and kindred organizations for several years. The complexity of views on the term hospitality have made it a difficult question to treat with a uniform remedy, but it is a question that must be solved, and the sooner we discuss it exhaustively the better.

There are many of us who have given it more than ordinary consideration. For the purpose of overcoming the difficulties which confront us, we have invariably kept steadily in view the hospitalities of the past, coupled with a high sense of our appreciation toward our benefactors.

An organization with a membership of some 1500 is too large a body to inflict unceremoniously on any community with the expectation of receiving a generous hospitality. When the American Pharmaceutical Association was a small determined band, it was an insignificant expense to receive and entertain them; to-day we are a powerful organization, and it requires a purse normally healthy and plethoric to treat it properly. The customary method of creating means to meet those expenditures is wholly by voluntary contributions.

It is needless for us to admit that in many instances, yes, fully one-half of such contributions are oppressive. It is high time that we recognized this fact and institute means to relieve our Association. From time to time suggestions of every kind have been employed to overcome the difficulty that surround this subject, but for the major part they have been partially impractical and too sentimental. We can only act on the practical side. I have given proper weight to every sentiment of hospitality and good fellowship, and can discover only the satisfactory solution by furnishing attending members at each annual meeting with a ticket at a price not exceeding $5; this sum will include one lady and every possible expense for one entertainment down to iced lemonade instead of water, to which we are unaccustomed. This amount will include carriage and boat rides, excursions, concert and banquet, all of which are attractive and necessary to make these reunions pleasurable and attractive. A concert or hop can be given to the ladies if deemed prudent and acceptable (weather permitting),—a real ladies' entertainment,—they must be made happy and comfortable. Those who are lame, wearied, or opposed to dancing, will be furnished some other equally good amusement, thus giving two temperaments an equal chance in the festivities.

For the purpose of strengthening my previous resolution, I will add to it the following amendment:

It is further provided that the President shall appoint a special committee of three, called the Entertainment Committee. It shall be the duty of this committee to coöperate with the Local Secretary and committee in the work of arranging our annual programme. I am confident that the creation of this committee will relieve the Association of a great deal of business, and in their hands will be lodged all the details of entertainments and excursions. For us it is a new departure, but it is an old rule of action with experienced conventions. One year will illustrate its advantages and good work.

It is an experiment that is justifiable, founded on tradition, value, and wisdom. We must seriously contemplate its merits. The actual price of a ticket depends on our attendance; an average attendance is 200, and, without using Vanderbilt's lead pencil, we can give ourselves a splendid entertainment for about $3 to $3.50, including one lady. The sum in no instance will exceed $5. The quality and quantities of our pleasures will invariably depend on the shrewdness of our general Entertainment and Local committees.

The plan adopted by European pharmaceutical associations is to charge each member about $5; the French require 20 francs, English 1 guinea, Germans 20 marks; our equivalent would be $5. This sum includes one week's entertainment, the usual time taken by the Association for vacation. When the annual announcement of meetings are made, each member receives a printed programme of the entire pleasure and business proceedings, and it does much toward increasing the number of attendants. This entire plan is worthy of adoption, not because it appears extravagant, not because it is of foreign origin, but, fellow-members, because it is wise, necessary, economical, attractive, and recuperative.

Too often the expenditures of European societies are less than the amount charged for tickets; all surplus is deposited to the Entertainment Fund, so that about once in five years members are entertained without charge by the association out of these accumulations of the Entertainment Fund. If we prefer, we can arrive at an approximate actual amount at each meeting. As we entertain ourselves at present, it will cost about $2.50 per ticket, but we want more. We are willing to spend $5 for a week's frolic and business provided it is arranged *secundum artem*.

Mr. Seabury's remarks were received with applause, and a motion was made by Mr. Candidus that the subject be referred to a committee of three, who are to confer with the Council.

Mr. Ebert moved to amend by referring the whole matter to the Council.

On taking the question, the amendment was rejected and the original motion adopted.

The President appointed Messrs. G. J. Seabury, T. J. Macmahan, and W. H. Rogers the Committee on Entertainment.

The minutes of the last meeting were read by the Secretary, and approved, after which, on motion of Mr. Menninger, the Association adjourned to meet again at Niagara Falls, N. Y., on the second Tuesday of September, 1882, at 3 o'clock P.M.

The following delegates have become members, without election, by signing the constitution:

Iowa.

R. W. Crawfort, Fort Dodge.
George B. Hogin, Newton.

New Jersey.

John P. Walker, Freehold.

Ohio.

Emil Heun, Cincinnati.

Ontario.

William Thomas Bray, Wingham.

JOHN M. MAISCH,
Permanent Secretary.

ENTERTAINMENTS AND EXCURSIONS.

THE Twenty-ninth Annual Meeting was well attended, the unusually low railroad fares prevailing at the time having induced many members from the Atlantic States to undertake the journey to the place of meeting, which is from 1000 to 1500 miles distant from their homes. Quite a number of ladies had joined the parties travelling by way of Buffalo, Southern Canada and Toledo, or by way of Washington, Parkersburg and Grafton to St. Louis, and thence to Kansas City. A large party, going by way of Buffalo, was delayed on the way in consequence of a strike by the railroad employés, and did not reach St. Louis, as contemplated, on Sunday morning. Those taking the Southern route were hospitably received by the pharmacists of Cincinnati, where they enjoyed the comforts of the Grand Hotel. Joined by the Cincinnati members and their ladies, the party had a pleasant journey to St. Louis, where excellent accommodations had been provided at the new Southern Hotel, and where they were the recipients of the hospitable attentions of the pharmacists of St. Louis.

At Kansas City no one hotel was large enough to accommodate all the visitors, but all were well taken care of under the circumstances. The Local Secretary, Mr. William T. Ford, and the pharmacists generally of the city, did all that could possibly have been wished, and, when it is remembered that none of them had ever met the American Pharmaceutical Association, their attentions and those of the citizens of the place of meeting are deserving of all praise; the more so, since the unusually hot weather and lack of rain at the time, extending over a great portion of the North American continent, made the sojourn in a new city not very enjoyable. With the thermometer usually in the nineties, with little shade and plenty of dust in the hilly streets, the situation was not excessively attractive; but, notwithstanding the grumbling complaints about the arrangements provided by the weather clerk, the party enjoyed themselves as well as could be done under the circumstances, and bore the molestations incidental to a continuous sweltering atmosphere with commendable good humor. In the meeting-room, the members found it somewhat conducive of comfort to divest themselves of their ordinary coats and sit with their thin linen dusters on, and even these it was on some occasions found desirable to lay aside.

The Kansas City meeting being the first at which the newly created Council was in active duty, the members of this body were well provided for with work between the sessions; thus relieving the Association of most of the routine business which formerly occupied so much valuable time.

Before sunset on Wednesday, August 24th, the pharmacists of Kansas City took the visiting ladies and members to a drive through the city and its environs, affording an opportunity of viewing the industrial and commercial enterprises and the rapid growth of this important place, and the improvements undertaken in various directions.

On Thursday evening the visitors, in response to an invitation by the local pharmacists, attended a reception in the rooms of the Board of Trade, where the exhibition of drugs, chemicals, apparatus, and other objects of pharmaceutical interest was in progress, partook of the bountiful collation and enjoyed themselves as well as possible.

An excursion farther west had been planned by the Pharmaceutical Association of the adjoining State of Kansas. Its destination was Santa Fé, New Mexico; but since on this trip the mountain region of Colorado was not reached, another excursion to the latter State was arranged, the party being increased by several who feared the possibility of being detained in New Mexico through an interruption of communication by wash-outs of the railroad track, which had repeatedly occurred during the past summer. However, a party numbering about one hundred left Kansas City on the morning of Friday, August 26th, by the Atchison, Topeka and Santa Fé Railroad, visited Lawrence and the Kansas State University, and, at Topeka, were hospitably entertained by the resident pharmacists. The journey across the plains lasted the whole of Saturday, when Coolidge was reached, where the country became more mountainous. After a stop of several hours at Trinidad, the tunnel near Ratan, which is 2500 feet long, was reached, but most of the party started afoot over the mountain—8000 feet above sea-level—the highest point reached during the journey. The next stopping-place was Las Vegas, in New Mexico, at an altitude of 6452 feet, a town of about 6000 inhabitants, with seven drug stores, and, in the old town, with houses built of adobe or sun-dried bricks, the walls being very thick. Here the churches and other places of interest were visited, and near morning of August 29th the journey was resumed, and Santa Fé was reached—the oldest city in the United States—which, when discovered by the Spaniards in 1541, was an old Indian village or pueblo, and has retained much of the quaintness and oddity of its early existence, though fast changing by the influx of American improvements. The river runs through the town; the burro or jackass is the usual burden carrier; the houses are mostly one-story high, and, like the old churches, are built of adobe; the streets are narrow, without curbing and without drainage. The plaza or public square embraces several acres, and is surrounded by the governor's adobe "palace," hotels, and principal business houses. A few of the latter, several private residences, a college building, a Methodist church, a hotel, and a hospital are the only buildings erected of other material than adobe.

Tuesday, August 30th, found the excursionists homeward bound. The ancient ruins of Peco Church were visited, also the hot springs (temperature 120° F.), about six miles distant from Las Vegas, and Kansas City was again reached after an absence of one week.

The Colorado excursionists, numbering over forty, including ten ladies, took the Union Pacific Railroad from Kansas City, on Friday morning, August 26th, and, after an uninterrupted ride of thirty-two hours reached Denver towards evening on the next day. On passing through Lawrence, they were greeted with music by the band, which afterwards accompanied the tourists to New Mexico. The ride over the great plains—the rolling prairies of Western Kansas and Eastern Colorado—afforded a novel sight by the absence of trees and rivers, the monotony being occasionally relieved by a habitation or small settlement, by a dry river-bed, by herds of grazing cattle, by a startled antelope, by colonies of prairie dogs, notably by the cacti and numerous flowers of all hues, and, on one occasion, by the emblem of stern justice,—the terror of horse-thieves and other malefactors,—the gallows, which could be seen for many miles in the distance. The sight of the Rocky Mountains was greeted with delight. In the afternoon a heavy thunderstorm passed along the mountain-sides and a refreshing shower, when nearing Denver, was a welcome relief from the hot southerly winds of the plains. Denver has been in existence only for about twenty years and numbers now over 40,000 inhabitants. The "Queen City of the Plains" affords a magnificent view of the Rocky Mountains, from which it is distant about 12 miles, and the peaks of which can be traced for a distance of nearly 200 miles. The broad streets are shaded by cottonwood trees, and are mostly bordered by rivulets of water brought twenty miles from the mountains for irrigation. The buildings are attractive and even elegant, and the streets and stores are in many instances illuminated by the electric light. At the Windsor Hotel the comforts of a first-class house were found.

On the following morning the party was joined by six members who had left Kansas City on Friday evening. Various places of interest were visited, and in the afternoon a visit was paid to the works of the Boston and Colorado Smelting Company, at Argo, permission having been obtained through the courtesy of Senator Hill. In roasting the ore the sulphides are converted into sulphates, the silver sulphate is dissolved in water, the metal is precipitated by copper plates, and the dissolved copper is recovered by precipitation with iron plates.

From Denver to Colorado Spring and Manitou the railway ascends the valleys of the Platte and of Plum Creek until Divide is reached, having an altitude of over 7000 feet, or 2000 feet higher than Denver. Palmer's Lake, situated on the summit, has an outlet northward to the Platte and southward to the Arkansas River. The curious forms of the rocks along Plum Creek—suggestive of castles, towers, and fortifications—give place, on the southward trip, to the weird and fantastic monument-like structures of Monument Park, a corner of which is traversed by the railway. From Manitou, where several other members were met, who had come by way of Pueblo, excursions were undertaken to the Garden of the Gods, with its balanced rocks and grotesque masses of red sandstone and white stone, towering often perpendicularly to the height of 300 or 400 feet; to Ute Pass and Rainbow Falls; to Williams's Cañon and the Cave of the Winds; to the various mineral springs, and to the numerous tents where many residents of Western cities rusticate during the summer months.

On Tuesday morning several of the party ascended Pike's Peak, 14,147 feet high, but only 8000 feet above Manitou. The larger number took a drive to South Cheyenne Cañon, with its imposing, precipitous walls, and at the head of which a lively stream of water falls, in seven cascades, from the height of nearly 500 feet. The entire party reached the Windsor, at Denver, on the same evening.

On Wednesday, August 31st, a westward trip was taken by a narrow-gauge branch of the Union Pacific Railroad. At Golden, fifteen miles from Denver, the road enters Clear Creek Cañon, having been cut into the solid rock, the cliffs towering on either side, almost vertically, to the height of from 1000 to 2500 feet. From the town of Black Hawk the railroad climbs, by a series of "switchbacks" five miles in length, the mountain-sides until it reaches Central City, distant one mile, but located 500 feet higher, at an altitude of 8343 feet. Here the tunnel in course of construction by the Bonanza and Union Mining Tunnelling Company was visited; also the entrance of the Bobtail Mine and the stamping-mill of the latter, where the precious metals are extracted from the ore by the amalgamation process.

The party took the cars back to Big Hill and from Forks Creek, by a branch road, to Georgetown, situated 8514 feet above sea-level, and on the following morning, Thursday, thirty of the party drove ten miles towards Gray's Peak, having an elevation of 14,341 feet, the final ascent—four miles—being made on horseback. Some of the party, which included seven ladies, felt the effect of the rarefied air—causing accelerated circulation, nausea, and dimness of vision. All returned in safety. The remainder of the party, including one lady, ascended the mountain to Green Lake, a distance of two and one-quarter miles, with a rise of 1700 feet. The placid lake, 10,200 feet above sea-level, encircled by towering mountains, was crossed in rowboats, and the Battle-ground of the Gods visited—a wilderness of huge rocks scattered about and piled up in the utmost confusion between Green and Clear Lakes. In the afternoon the Devil's Gate and Bridal Veil Falls were visited.

On Friday most of the party returned directly to Denver, while about ten spent the greater part of the day at Idaho Springs, 7512 feet above sea-level, and received the kind attentions of Hon. M. Moore and T. B. Bryan. A bath in the water of the hot soda spring was enjoyed by all, and a visit to the big tunnel which is being worked into the Seaton Mountain was instructive and full of interest.

On the same evening a portion of the party left Denver on their return trip to Kansas City, and on Saturday, while crossing the plains, were gratified with a magnificent view of a mirage towards the south—a broad strip of land looming up above the horizon, leaving the intervening space of the appearance of a mighty river.

The remainder of the party, on Saturday, took a trip to the South Park, along the cañon of South Platte River, through wild and romantic passes, and over Kenosho Summit until Jefferson was reached, where the train was taken back to Denver, and on the following day, to Cheyenne and Omaha; thence to Chicago, and home.

The distance travelled by rail was, for most of the Eastern members, between 4400 and 5600 miles, the southern route being the shortest. "Quantum sufficit," remarked a fellow-excursionist.

John M. Maisch,
Permanent Secretary.

LIST OF COLLEGES AND ASSOCIATIONS

Having Accredited Delegates to the Twenty-ninth Annual Meeting, with the Addresses of their Presidents and Secretaries.

COLLEGES OF PHARMACY.

	President.	Secretary.
Chicago,	N. Gray Bartlett.	J. S. Jacobus.
Cincinnati,	H. F. Reum.	F. Schuerman.
Louisville,	V. Davis.	F. C. Miller.
Maryland,	Joseph Roberts.	Edwin Eareckson.
Massachusetts,	B. F. Stacy.	Henry Canning.
National, Wash'n,	W. G. Duckett.	Charles Becker, Georgetown, D. C.
New York,	Ewen McIntyre.	P. F. Lehlbach.
Ontario,	William Saunders.	G. Hodgetts.
Philadelphia,	Dillwyn Parrish.	William J. Jenks.
St. Louis,	W. H. Crawford.	E. P. Walsh.

STATE PHARMACEUTICAL ASSOCIATIONS.

	President.	Secretary.
Alabama,		S. W. Gillespie, Birmingham.
Connecticut,	Hugh H. Osgood, Norwich.	Frederick Wilcox, Waterbury.
Georgia,	Theodore Schumann, Atlanta.	S. P. Shuptrine, Savannah.
Illinois,	F. C. Bourscheidt, Peoria.	M. W. Borland, Chicago.
Iowa,	Geo. B. Hogin, Newton.	E. L. Boerner, Iowa City.
Kansas,	R. J. Brown, Leavenworth.	G. A. Chapman, Atchison.
Kentucky,	C. S. Porter, Eminence.	William G. White, Richmond.
Missouri,	R. T. Miller, Sedalia.	W. T. Ford, Kansas City.
New Hampshire,	C. A. Tufts, Dover.	George F. Underhill, Concord.
New Jersey,	C. Holzhauer, Newark.	A. P. Brown, Camden.
New York,		C. W. Holmes, Elmira.
Ohio,	John F. Judge, Cincinnati.	L. C. Hopp, Cleveland.
Pennsylvania,	Geo. A. Kelly, Pittsburgh.	J. A. Miller, Harrisburg.
Wisconsin,	F. Robinson.	E. B. Heimstreet, Janesville.

LOCAL PHARMACEUTICAL ASSOCIATIONS.

	President.	Secretary.
German Apothecaries, New York,	P. F. Lehlbach.	L. G. W. Ruprecht.
King's County, New York,		L. E. Nicot, Brooklyn.
Richmond, Va.,	Hugh Blair.	

ALUMNI ASSOCIATIONS OF COLLEGES OF PHARMACY.

	President.	Secretary.
Cincinnati,	John H. Linneman.	J. F. Zuenkeler.
Massachusetts,	William C. Durkee.	
New York,	Thomas F. Main.	
Philadelphia,	T. H. Potts.	William E. Krewson.
St. Louis,	J. W. Tomfohrde.	G. H. M. Goehring.

LIST OF PUBLICATIONS RECEIVED

For the American Pharmaceutical Association.

Societies and editors are respectfully requested to forward all publications intended for the American Pharmaceutical Association to the Permanent Secretary. European exchanges, if not sent by mail, will reach us through the Smithsonian Institution at Washington.

JOHN M. MAISCH,
143 North Tenth Street, Philadelphia, Pa.

The Druggists' Circular, New York, 1881.
New Remedies, New York, 1881.
Oil, Paint, and Drug Reporter, New York, 1881.
Oil and Drug News, New York, III.
American Journal of Medical Sciences, Philadelphia, 1881.
Medical News and Library, Philadelphia, 1881.
The Pharmacist, Chicago, 1881.
The Druggist, Chicago, 1881.
Pacific Medical and Surgical Journal, San Francisco, 1881.
The Canadian Pharmaceutical Journal. Edited by E. B. Shuttleworth, 1881.
Pharmaceutical Journal and Transactions, London, 1881.
Yearbook of Pharmacy and Transactions of the British Pharmaceutical Conference, 1881.
The Chemist and Druggist, London, 1881.
The Chemists' and Druggists' Diary, 1882.
Proceedings of the Philosophical Society of Glasgow, XII, No. 1.
Pharmaceutische Zeitschrift für Russland, 1880, Nos. 19–24.
Transactions of the American Medical Association, 1881.
Nachrichten von der K. Gesellschaft der Wissenschaften, etc. Göttingen, 1880.
Archiv der Pharmacie, Halle, 1881.
Zeitschrift des Allgemeinen Oesterreichischen Apotheker-Vereines. Wien, 1881.
Anzeiger der K. K. Akademie der Wissenschaften. Wien, 1881.
Sitzungsberichte der K. B. Akademie der Wissenschaften, 1880, 3, 4. 1881, 1.
Ueber den geologischen Bau der libyschen Wüste. Von Dr. K. A. Zittel.
Schweizerische Wochenschrift für Pharmacie, 1881.
Annual Report of the Mercantile Library Company of Philadelphia, 1880.
Annual Report of the Astor Library Company of the City of New York, 1880.
Calendar of the University of Michigan for 1881.
Annual Report of the President to the Corporation of Brown University, 1881.
Catalogue of the University of Vermont and State Agricultural College, 1881.
Proceedings of the New Jersey Pharmaceutical Association, 1881.
Proceedings of the American Academy of Arts and Sciences, XVI, 1, 2.
Transactions of the College of Physicians of Philadelphia, 1881.
Proceedings of State Medical Societies, 1881: Connecticut, C. W. Chamberlain, Secretary, Hartford; Minnesota, C. H. Boardman, Secretary, St. Paul; South Carolina, H. D. Fraser, Secretary, Charleston.

LIST OF SOCIETIES, LIBRARIES, JOURNALS, AND INDIVIDUALS,

To whom Complimentary Copies of the Proceedings of this Association are forwarded.

The State Libraries of all the States of the Union except Connecticut.

Maine Insane Asylum,	Augusta, Maine.
Bowdoin College,	Brunswick, “
Dartmouth College,	Hanover, New Hampshire.
New Hampshire Medical Society, Dr. G. P. Conn, Secretary,	Concord, “
Amherst College,	Amherst, Massachusetts.
Harvard University,	Cambridge, “
Massachusetts College of Pharmacy,	Boston, “
American Academy of Arts and Sciences,	“ “
Medical Library Association,	“ “
City Library,	“ “
City Hospital,	“ “
Massachusetts General Hospital,	“ “
Boston Athenæum,	“ “
University of Vermont,	Burlington, Vermont.
Brown University,	Providence, Rhode Island.
Trinity College,	Hartford, Connecticut.
Medical Journal and Library Association,	“ “
Connecticut Medical Society, C. W. Chamberlin, M.D.,	“ “
Silas Bronson Library,	Waterbury, “
Yale College,	New Haven, “
College of Pharmacy of the City of New York,	New York, New York.
Literary and Scientific Society of German Apothecaries,	“ “
Druggists' Circular,	“ “
New Remedies, Dr. Castle, editor, 102 East Fifty-seventh Street,	“ “
Oil, Paint, and Drug Reporter,	“ “
Oil and Drug News,	“ “
Deutsch-Americanische Apotheker Zeitung,	“ “
Astor Library,	“ “
Mercantile Library,	“ “
Long Island Historical Society,	Brooklyn, “
New Jersey State Lunatic Asylum,	Trenton, New Jersey.
Philadelphia College of Pharmacy,	Philadelphia, Pennsylvania.
College of Physicians,	“ “

Pennsylvania Hospital,	Philadelphia, Pennsylvania.
Academy of Natural Sciences,	“ “
American Philosophical Society,	“ “
Philadelphia Library,	“ “
Mercantile Library,	“ “
American Journal of Medical Sciences,	“ “
Medical Society of the State of Pennsylvania,	“ “
Pittsburgh College of Pharmacy,	Pittsburgh, “
Maryland College of Pharmacy,	Baltimore, Maryland.
University of Maryland,	“ “
Maryland Academy of Sciences,	“ “
Smithsonian Institution,	Washington, District Columbia.
Congressional Library,	“ “
Surgeon-General United States Army,	“ “
Surgeon-General United States Marine Hospital Service,	“ “
Surgeon-General United States Navy,	“ “
Bureau of Education,	“ “
Department of Agriculture,	“ “
United States Patent Office,	“ “
National College of Pharmacy,	“ “
Library of the American Medical Association,	“ “
Medical Society of the District of Columbia,	“ “
Richmond Pharmaceutical Association,	Richmond, Virginia.
Medical Society of Virginia, L. B. Edwards, M.D., Secretary,	“ “
South Carolina Medical Association, Dr. H D. Fraser, Secretary,	Charleston, South Carolina.
Tennessee College of Pharmacy,	Nashville, Tennessee.
Louisville College of Pharmacy,	Louisville, Kentucky.
Cincinnati College of Pharmacy,	Cincinnati, Ohio.
Cincinnati Academy of Medicine,	“ “
Mussey Medical Library,	“ “
Longview Asylum,	Carthage, Hamilton Co., Ohio.
University of Michigan,	Ann Arbor, Michigan.
Chicago College of Pharmacy,	Chicago, Illinois.
The Druggist,	“ “
Illinois State Medical Society,	“ “
St. Louis College of Pharmacy,	St. Louis, Missouri.
St. Louis Academy of Science,	“ “
St. Louis Mercantile Library,	“ “
St. Louis Public School Library,	“ “
Kansas State University,	Lawrence, Kansas.
Minnesota State Medical Society, C. H. Boardman, M.D., Secretary,	St. Paul, Minnesota.
California College of Pharmacy,	San Francisco, California.
Pacific Medical and Surgical Journal,	“ “
Montreal College of Pharmacy, Toronto, Canada.	
Ontario College of Pharmacy, Toronto, Canada.	
Pharmaceutical Department, Halifax Medical College, Nova Scotia.	
Escuela de Farmacia, Mexico.	

Sociedad Medico-farmaceutico, Merida, Yucatan.
Sociedad de Farmacia Argentina, Buenos Ayres.
British Pharmaceutical Conference, London.
Pharmaceutical Society of Great Britain, London, 17 Bloomsbury Square.
Pharmaceutical Journal and Transactions, London.
Chemical News, London, Boy Court, Ludgate Hill, E. C.
Chemist and Druggist, London, 44 Cannon Street.
Chemists' Journal, London, 12 Little Tower Street, E. C.
Journal of Applied Science, London, 3 St. Martin's Place, Charing Cross.
British Museum, London.
Philosophical Society, Glasgow.
Liverpool Chemists' Association.
Association of Chemists and Druggists, Wolverhampton.
Coventry and Warwickshire Pharmaceutical Association, Coventry.
Pharmaceutical Society at Edinburgh.
Pharmaceutical Society of Ireland, Dublin.
Nederlandsche Maatschappij ter bevordering der Pharmacie, A. J. Rijk, President, Amsterdam.
Académie Royale de Médecine de Belgique, Bruxelles.
Société de Pharmacie Royale de Bruxelles.
Société Royale des Sciences Médicales et Naturelles, Bruxelles.
Société de Pharmacie d'Anvers.
Société de Pharmacie, Paris.
Académie des Sciences, Paris.
Répertoire de Pharmacie, Paris.
Schweizerische Wochenschrift für Pharmacie, A. Klunge, Aubonne.
Zeitschrift d. Allg. Oesterreichischen Apotheker-Vereins, Wien.
K. K. Gesellschaft der Aerzte, Wien.
K. Akademie der Wissenschaften, Wien.
K. Bayer. Akademie der Wissenschaften, München.
University of Strassburg.
Journal de Pharmacie d'Alsace-Lorraine, N. Nicklès, Benfeld.
Deutscher Apotheker-Verein, Dr. Brunnengraeber, Rostock.
Archiv der Pharmacie, Waisenhausbuchhandlung, Halle.
Professor Dr. Wöhler, Göttingen.
K. Akademie der Wissenschaften, Göttingen.
Verein der Apotheker, Berlin.
Pharmaceutische Centralhalle, Dr. E. Giessler, Dresden.
Pharmaceutische Zeitung, Bunzlau.
Pharmaceutische Gesellschaft in St. Petersburg, St. Petersburg.
Pharmaceutisches Institut, Dorpat, Russia.
Pharmaceutical Institution, Stockholm, Sweden.
Kongelige Norske Universitet i Christiani.
Archiv for Pharmacie, S. M. Trier, Kjobenhavn.
Danmark's Apotheker Forening, Gust. Lodze, President, Odense.
Centro Pharmaceutico Portuguez, Porto, Portugal.
R. Biblioteca Nazionale, Firenze, Italy.
Archivio di Farmazia, Roma, Italy.
Pharmaceutical Society of Victoria, Melbourne, Australia.
Pharmaceutical Society of New South Wales, Sydney.
Pharmaceutical Society of New Zealand, Auckland.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulteration.

2. To encourage proper relations between Druggists, Pharmaceutists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing, and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory, and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a Permanent Secretary, a Local Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually, and shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting; when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

BY-LAWS.

CHAPTER I.

Of the President and Vice-Presidents.

ARTICLE I. The President shall preside at all meetings of the Association; in his absence or inability, one of the Vice Presidents, or in the absence of all, a President *pro tempore* shall perform the duties of President.

ARTICLE II. He and the Vice-Presidents shall be *ex-officio* members of the Council.

ARTICLE III. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore.*

ARTICLE IV. In meetings the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports, and communications, and order the vote upon all proper questions at the proper time.

ARTICLE V. In all ballotings, and on questions upon which the yeas and nays are taken, the President is required to vote, but his name should be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal, and in case of such equal division the motion is lost.

ARTICLE VI. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in case of personality or impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in cases where he prefers to submit the matter to the meeting; decide promptly who is to speak when two or more members rise at the same moment; and be careful to see that business is brought forward in proper order.

ARTICLE VII. He shall have the right to call a member to the chair, in order that he may take the floor, in debate. He shall see that the Constitution and By-Laws are properly enforced.

ARTICLE VIII. He shall appoint all committees, unless provided for in the By-Laws, or otherwise directed by the Association.

ARTICLE IX. He shall sign the certificates of membership, and countersign all orders on the Treasurer. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE X. He shall present at each Annual Meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER II.

Of the Permanent Secretary.

ARTICLE I. The Permanent Secretary shall be elected to hold office permanently, during the pleasure of the Association. He shall receive from the Treasurer an annual salary of $600, and the amount of his expenses incident to the meeting in addition to his salary.

ARTICLE II. He shall preserve fair and correct minutes of the proceedings of the meetings, and carefully preserve, on file, all reports, essays, and papers of every description received by the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Proceedings of the Association, under the direction of the Council.

ARTICLE III. He shall read all papers handed him by the President for that purpose; shall call and record the yeas and nays whenever they are required to be called; shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act; and shall notify every member of the time and place of each Annual Meeting.

ARTICLE IV. He shall be, *ex-officio*, a member of the Council.

CHAPTER III.

Of the Local Secretary.

ARTICLE I. The Local Secretary shall be elected annually, near the close of the Annual Meeting, and shall reside at or near the place where the next Annual Meeting of the Association is to be held.

ARTICLE II. He shall assist the Permanent Secretary in his duties; shall co-operate with the Council and any local committee in making arrangements for the Annual Meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

CHAPTER IV.

Of the Treasurer.

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Council, previous to each Annual Meeting, the names of such members as have failed to pay their annual contributions for three years, and also the names of such as have failed to return their certificates of membership after having been officially disconnected with the Association, and having been duly notified to return them.

ARTICLE IV. He shall present a statement of his accounts at each Annual Meeting of the Council, that they may be audited; he shall receive an annual salary of $500, and the amount of his expenses incident to the meeting in addition to his salary.

CHAPTER V.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services such sum as may be annually determined upon by the Council.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the Permanent Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the Permanent Secretary for preservation.

ARTICLE III. From these and other available sources he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry, and Materia Medica, and the collateral branches of knowledge; on the changes in conditions of Pharmaceutical Institutions, together with such statistical, biographical, and obituary notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the Annual Meeting.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the Permanent Secretary and the Chairman of the Council shall be required to make the best arrangements they can command, to continue the work to its completion.

CHAPTER VI.

Of the Council.

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which shall be empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association.

ARTICLE II. The Council shall consist of seventeen members, nine of whom shall be elected by ballot by the Association, in the following manner: Three of them to serve for one year, three for two years, three for three years. At each subsequent Annual Meeting three members shall be elected to take the place of those whose terms will then expire, to serve for the term of three years.

ARTICLE III. The President, Vice-Presidents, Secretary, Local Secretary, Treasurer, and Reporter on the Progress of Pharmacy of the Association shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next Annual Meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, to be elected by ballot annually by the Council.

ARTICLE VI. The Council shall be charged with the transaction of unfinished business of the Association, from one Annual Meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the Annual Meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council,—a Committee on Membership, a Committee on Publication, and a Committee on Finance,—to whom shall be referred such duties as are appropriate to their respective functions as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section* 1. The Council shall have charge of the revision of the roll and the publication of the Proceedings.

Section 2. The Secretary of the Council shall read at one session of the Association the names of those candidates for membership which have been approved by the Committee on Membership, and the applicants shall be balloted for at the next session of the Council by the members present, when a vote of two-thirds shall be sufficient to elect them.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be balloted for without first receiving the approval of the Council.

Section 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members, and the names of any who, having become disconnected with the Association, refuse to return their certificate of membership as provided by the by-laws.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears one copy of the annual publication of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sittings of the Association and of the Council, the reports of the President and committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as they may deem worthy of insertion, and shall fix the price at which the Proceedings shall be sold.

CHAPTER VII.

Of Committees.

ARTICLE I. There shall be elected annually four standing committees: A Committee on the Drug Market, to consist of five members; a Committee on Papers and Queries, a Committee on Prize Essays, and a Committee on Legislation; each to consist of three members.

ARTICLE II. The Committee on the Drug Market shall report annually the condition of the Drug Market, the fluctuations in the supply and demand of drugs and chemicals, the variations in quality, and the adulterations and sophistications coming under their observation or reported to them by others, with any suggestions or recommendations for the improvement or better regulation of the trade; and they shall be authorized to report upon any adulterations and sophistications of immediate interest, through the Pharmaceutical Journals, as soon as practicable after their discovery.

ARTICLE III. The Committee on Papers and Queries shall report, near the close of each Annual Meeting, a proper number of questions of scientific and practical interest, the answers to which may advance the interest of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

Article IV. Any person writing a paper for the Association must, to insure its publication in the Proceedings, refer the same with a synopsis of its contents to the Committee on Papers and Queries previous to the third session.

Article V. It shall be the duty of every Standing Committee making a report annually to the Association, in like manner to furnish a copy of the same, together with a synopsis of its contents, to the Committee on Papers and Queries, before the first annual session of the Association.

Article VI. The Committee on Prize Essays shall, within six months after the Annual Meeting at which the essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all other respects they shall be governed by the stipulations expressed by the donor. The decision of the committee, with such comments upon the successful essay only as they may deem proper, may be published in the Journals of Pharmacy.

Article VII. The Committee on Legislation shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on the subject has occurred during the year.

CHAPTER VIII.

Of Membership.

Article I. Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry, and Botany, who may be specially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of its Constitution and By-laws, are willing to subscribe to them, are eligible to membership.

Article II. Any person eligible to membership may make application in writing, with the indorsement of any two members of the Association in good standing, to any member of the Council, who shall report his application to the said Council.

Article III. No person shall be a member of this Association, nor shall his name be placed upon the roll, until he shall have signed the Constitution and paid into the Treasury the sum of *Five Dollars* as an initiation fee, and the annual contribution for the current year, which sums must accompany the application.

Article IV. Every member shall pay in advance to the Treasury the sum of *Five Dollars* as his yearly contribution, and is liable to lose his membership by neglecting to pay said contribution for *three successive years.*

Article V. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of $75 during the first year of his connection therewith, or after five years $70, or after ten years $60, or after fifteen years $50, or after twenty years $40, shall become a life-member and shall be exempt from all future annual contributions.

Article VI. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the Annual Meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year and the usual initiation fee.

Article VII. Members shall be entitled, on the payment of *Five Dollars,* to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, Permanent Secretary, and Treasurer, at the same time covenanting to return the same to the proper officer on relinquishing their connection with the Association.

Article VIII. Persons constitutionally elected to membership become permanent members, and their membership can cease only by resignation, non-payment of dues, or by expulsion, as provided in these By-laws.

Article IX. Resignation of membership shall be made in writing to the Permanent Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

Article X. Any member may be expelled for improper conduct or the violation of the Constitution, By-laws, or Ethics adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at some regular session.

Article XI. Pharmaceutists, chemists, and other scientific men, who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office, or vote at the meetings.

CHAPTER IX.

Of Meetings.

Article I. The meetings shall be held annually; provided, that in case of failure of this from any cause the duty of calling the Association together shall devolve upon the President or one of the Vice-Presidents, with the advice and consent of the Council.

Article II. The order of business at the first session of each Annual Meeting shall be as follows:

Section 1. Promptly, at the time named in the notice issued for the meeting, the President, or in his absence one of the Vice-Presidents, or in their absence a President *pro tempore*, shall officiate.

Section 2. In the absence of the Permanent Secretary the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the Permanent Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President shall appoint a committee of three persons to examine the credentials of delegates, which committee shall attend to that duty. The President's address may then be read, after which the committee shall report to the Association as soon as practicable, when the Secretary shall call the roll, noting the names of the delegates and members in attendance.

Section 5. The Council shall read the names of the candidates for membership, as provided in Section 2, Article VIII, Chapter VI.

Section 6. Reports of committees shall be presented, read by their titles, the synopsis, or in full, and laid on the table for future consideration.

Section 7. The President shall call the roll of Colleges and Associations represented, requesting each delegation in turn to appoint one member, the persons so selected to act as a committee to nominate officers for the Association, the Standing Committees, and members of the Council for the ensuing year; in addition to which he shall appoint five members, who are not delegates, to act with the committee.

Section 8. The minutes of the Council shall be read in full at the Annual Meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present, or if disapproved by a majority of the members present, their acts shall be revised, so as to be acceptable to the Association.

Section 9. A committee of five shall be appointed to examine and report upon specimens exhibited.

Section 10. Incidental business may be called up.

ARTICLE III. The order of business at the second session of each Annual Meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding meeting, which may be amended if necessary, and shall then be approved.

Section 3. The report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the Officers and Committees nominated shall be balloted for.

Section 4. The officers elected shall take their respective places.

Section 5. The Council shall present names recommended for membership.

Section 6. Reports of Standing Committees shall be read.

Section 7. Reports of Special Committees shall be read.

Section 8. The second session shall close with the examination of specimens on exhibition.

ARTICLE IV. The order of business at subsequent sessions shall be determined by the Council, with the consent of the Association.

ARTICLE V. *Section* 1. The Association invites manufacturers and others to exhibit at the Annual Meeting crude drugs, chemicals, pharmaceutical preparations, chemical and pharmaceutical apparatus and utensils, and such objects as possess a general scientific or special pharmaceutical interest.

Section 2. The following articles shall not be admitted to these exhibitions: Proprietary and patented medicines, medicinal or pharmaceutical preparations the names of which have been copyrighted or the complete working formula for which is withheld, and such chemical preparations or mixtures which are offered under other than their proper scientifically recognized names.

Section 3. The Committee on Exhibition, appointed under Chapter VIII, Article II, Section 9, shall report during the meeting on the articles exhibited, with such comments as in their judgment may be deemed proper.

CHAPTER X.

Of Rules of Order and Debate.

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the meeting, and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order in which they are arranged. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

CHAPTER XI.

Miscellaneous.

ARTICLE I. In all such points of order as are not noticed in these By-laws the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

ARTICLE II. Every proposition to alter or amend these By-laws shall be submitted in writing, and may be balloted for at any subsequent session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-laws.

ARTICLE III. No one or more of these By-laws shall be suspended.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

Article I. The officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, who shall be elected by ballot by the Council to serve one year.

Article II. They shall be elected and shall assume the duties of their respective offices immediately after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

Article I. The Chairman shall preside at all meetings of the Council; in his absence, or on account of inability from any cause, the Vice-Chairman; or, in the absence of both, a Chairman *pro tempore* shall perform the duties of Chairman.

Article II. The Chairman of the Council shall confer with the chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

Article I. The Secretary shall preserve fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council.

Article II. He shall post in a conspicuous place in the meeting-room the names of the applicants for membership.

Article III. He shall read all papers handed him by the Chairman for that purpose, shall call and record the yeas and nays whenever they are required to be called; he shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting.

CHAPTER IV.

Committee on Membership.

Article I. The Committee on Membership shall consist of five (5) members of the Council, to be elected annually by ballot. The Permanent Secretary and the Treasurer of the Association shall be *ex-officio* members of this committee. The committee shall elect their chairman immediately after their election by the Council.

Article II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present the list of applicants for membership, who have complied with the requirements of the By-Laws of the Association, to the Council.

ARTICLE III. They shall furnish appropriate obituary notices of deceased members for publication in the Proceedings.

CHAPTER V.

On Committee on Publication.

ARTICLE I. The Committee on Publication shall consist of five (5) members, to be elected by ballot by the Council, who shall elect their chairman immediately after their own election by the Council.

ARTICLE II. The Committee on Publication shall have charge of the publication of the Proceedings, and may select annually the portrait of a deceased member to be issued with the Proceedings.

CHAPTER VI.

On Committee on Finance.

ARTICLE I. The Committee on Finance shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VII.

Of the Centennial Fund.

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the Permanent Secretary. They shall annually at the meetings, and after due notice through the Pharmaceutical Journals, receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount of material required, it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. After considering these applications, the Committee shall, at as early a date as possible, report to the Council, recommending such grants from the available funds as they may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VIII.

On Meetings.

ARTICLE I. The Council shall meet on the day immediately preceding that fixed for the assembling of the Association, and at such other times as they may adjourn to, or at the call of the Chairman.

ARTICLE II. On the written application of three (3) members to the Chairman of the Council, a special meeting shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

CHAPTER IX.

Miscellaneous.

ARTICLE I. Three members of any of the standing committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its committees, and which can be disposed of by a positive or a negative vote, the Chairman of the Council, or the chairman of the committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present.

FORM OF APPLICATION FOR MEMBERSHIP.

Approving of the objects of the American Pharmaceutical Association, I am desirous of joining it in membership; and, having read its Constitution and By-laws, I hereby signify my approval of the same, and subscribe to them.

____

Address, ____________________________________

I hereby agree to return my certificate of membership in the American Pharmaceutical Association to the Treasurer of that body, if I shall hereafter cease to be connected in membership with it.

____

TESTIMONIALS.

The undersigned, members in good standing, being personally acquainted with of testify to his moral character, his skill as a practical druggist and pharmaceutist, and his professional probity and good standing, and they recommend him for membership in the American Pharmaceutical Association.

Name.	Address.

ROLL OF MEMBERS.

HONORARY MEMBERS.

UNITED STATES OF AMERICA.

Daniel B. Smith, Philadelphia, Penna., 1856.

FOREIGN COUNTRIES.

AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

BELGIUM.

A. T. De Meyer, *Brussels*, 1868.
Norbert Gille, *Brussels*, 1868.

ENGLAND.

Dr. John Attfield, *London*, 1871.
Dr. Robert Bentley, *London*, 1872.
Henry B. Brady, *Newcastle-on-Tyne*, 1871.
Dr. J. Redwood, *London*, 1871.

FRANCE.

Dr. Augustin A. Délondre, *Sèvres*, 1871.
Stanilas Martin, *Paris*, 1872.
Dr. G. Planchon, *Paris*, 1877.
Dr. J. Léon Soubeiran, *Montpellier*, 1871.

GERMANY.

Dr. Adolph Duflos, *Annaberg*, 1871.
Dr. Hermann Hager, *Pulvermühle bei Fürstenberg*, 1868.
Dr. F. A. Flückiger, *Strassburg*, 1868.
Dr. G. C. Wittstein, *Munich*, 1868.

GREECE.

Dr. Xaver Landerer, Athens, 1877.

NETHERLANDS.

Dr. J. E. De Vrij, *Hague*, 1871.

RUSSIA.

Dr. G. Dragendorff, *Dorpat*, 1868.

SWITZERLAND.

Dr. Edward Schaer, *Zurich*, 1877.

ACTIVE MEMBERS.

Members are requested to report any inaccuracies in these lists, and to notify the Secretary and Treasurer of all changes of address.

(The names of life-members in SMALL CAPITALS. Names of life-members under the old Constitution in *italics*.)

UNITED STATES OF AMERICA.

ALABAMA.

Mobile.

Candidus, Philip Charles,	1857
Hawkins, Joseph Thomas,	1878
Mohr, Charles,	1871
Moore, Thomas F.,	1878
Punch, William Francis,	1874
Savage, Thomas Jameson,	1881
Van Antwerp, Garet,	1880

ARKANSAS.

Hot Springs.

Cabell, George William,	1880
Eisele, Martin A.,	1881
Newman, Alcuin Eason,	1880
Pollard, Frank Wilder,	1880

CALIFORNIA.

San Francisco.

Calvert, John,	1870
Elbe, Constantine Berthold,	1877
Lengfeld, Abraham Louis,	1879
Mack, Adolph,	1880
Moffit, Thomas S.,	1861
Painter, Emlen,	1870
Runyan, Edward Wheelock,	1875
Simpson, William,	1870
Steele, Henry,	1859
Steele, James Gurden,	1859
Vreeland, Phrank Louis,	1880
Wenzell, William Theodore,	1870

Eureka, Humboldt Bay.

Powell, Robert Baldwin,	1880

Marysville, Yuba Co.

Flint, John Henry,	1873

San Jose.

Brown, Joseph John,	1876

Santa Barbara.

Finger, Henry James,	1878

Santa Clara.

Oberdeener, Moses,	1880

Vallejo, Solano Co.

Frost, James,	1870
Topley, James,	1869

COLORADO.

Central City.

Best, John,	1866

Denver.

Hartung, Hugo Rudolph,	1876
Scholtz, Edmund Louis,	1881
Steinhauer, Frederick,	1881
Walbrach, Arthur,	1881

COLUMBIA, DISTRICT OF.

Georgetown.

Becker, Charles,	1875

Washington.

Berrian, George Washington,	1857
Bury, Edward Berkley,	1870
Christiani, Charles,	1874
Cromwell, Zachariah William,	1870
Drew, John Waters,	1876
Duckett, Walter G.,	1876
Dufour, Clarence Reuter,	1876
Entwisle, William Burton,	1873
Ferguson, Robert Benedict,	1867
Knabe, Gustavus Alexander,	1876
Lewis, Samuel Edwin,	1875
Major, John Richards,	1873
Milburn, John Alexander,	1858
O'Donnell, James Dominic,	1870
Pettingill, Edward True,	1880
Reinlein, Paul,	1856
Scala, William Franklin,	1876

Schafhirt, Adolph Julian, . 1876
Simms, Giles Green Craycroft, 1860
Thompson, William Scott, . 1871
Tyson, Samuel Ellicott, . . 1857

CONNECTICUT.

Ansonia.

Bristol, Charles Edward, . . 1880

Hartford.

Chapin, Frederick Hastings, . 1880
Goodrich, Stephen, . . . 1875
Goodwin, Lester Henry, . . 1875
Rapelye, Charles Andrew, . 1876
Williams, John Kirby, . . 1875

Litchfield.

Gates, Howard Eugene, . . 1873

Middletown.

Pitt, John Richard, Jr., . . 1872

Naugatuck.

May, James Oscar, . . . 1875

New Britain.

Thomson, Edward Willet, . 1880

New Haven.

Gessner, Emil Adolph, . . 1878
Kelsey, Henry, Jr., . . . 1873
Spalding, Warren Alphonso, . 1876
Sperry, Herman Jay, . . 1880
Wells, Charles William, . . 1879
Wells, Romanta, . . . 1877
Wood, Alonzo Felton, . . 1876

Norwalk.

Betts, Howard Seeley, . . 1880

Norwich.

Osgood, Hugh Henry, . . 1875
Sevin, Nathan Douglass, . . 1875

Stamford.

Haight, William Bogardus, . 1872

Waterbury.

Dikeman, Nathan, . . . 1859
Munson, Luzerne Ithiel, . . 1872
Wilcox, Frederick, . . . 1878
Woodruff, Roderick Samuel, . 1876

West Winsted.

Phelps, Dwight, . . . 1873

Winsted.

Renouff, James Theron, . . 1877

DELAWARE.

Wilmington.

Belt, Zedekiah James, . . 1876
Smith, Linton, . . . 1870

FLORIDA.

Fort George.

Rollins, John Francis, . . 1859

Jacksonville.

Hughes, Benjamin Longmore, . 1878

Monticello.

Palmer, John Dabney, . . 1875

Waldo.

Wheeler, Lucien Fitch, . . 1858

GEORGIA.

Albany.

Welch, Leonard Edward, . 1878

Atlanta.

Avery, Archibald, . . . 1878
Bradfield, Louis Henry, . . 1878
Daniels, John B., . . . 1871
Greene, Charles H., . . . 1878
Peacock, Frederick Stanley, . 1871
Pinson, John Lumpkin, . . 1878
Rankin, Jesse Willis, . . 1877
Schumann, Peter John, . . 1878
Schumann, Theodore, . . 1860
Taylor, Walter Adolphus, . 1876

Augusta.

Land, Robert Henry, . . 1859

Cartersville.

Curry, David W., . . . 1878

Cuthbert.

Stanford, James William, . 1878

Hawkinsville, Pulaski Co.

Fale, John, ... 1877

Macon.

Brunner, Norman Isaac, . . 1878
Hall, Roland Butler, . . 1877
Hunt, Leonard Washington, . 1878

Ingalls, John,	1876
McConville, Thomas Aloysius,	1864

Milledgeville.

Grieve, Fleming Grantland,	1859

Rome.

Fenner, William Roane,	1871
Turner, Prior Lee,	1878

Savannah.

Yonge, St. John R.,	1878

ILLINOIS.

Aurora.

Chase, John Bidwell,	1880

Bloomington.

Fell, Theron Edwin,	1880

Bradford, Stark Co.

Plummer, David Graham,	1869
Plummer William Pitt,	1881

Camp Point.

Bartells, George C.,	1881

Chicago.

Bartlet, Nicholas Gray,	1864
Biroth, Henry,	1865
Blahnik, Lorenz,	1881
Blocki, William Frederick,	1863
Borland, Matthew Wilson,	1876
Buck, George,	1860
Button, Charles E.,	1881
Coffin, Samuel Lockwood,	1879
Cowdrey, Robert Hall,	1879
Dale, William Macmillan,	1880
Fischer, Edward J.,	1875
Fox, Daniel S.,	1872
Fredigke, Charles Christian,	1869
Fuller, Henry Weld,	1865
Fuller, Oliver Franklin,	1869
Gale, Edwin Oscar,	1857
Gale, William Henry,	1857
Garrison, Herod Daily,	1869
Hallberg, Carl Swante Nicanor,	1879
Hamilton, Emil,	1881
Hartwig, Charles F.,	1881
Heuermann, Henry William,	1869
Hogan, Lewis Cass,	1876
Hogey, Julius Henry,	1880
Hooper, John Henry,	1865
Jacobus, Judson Schradlow,	1870
Kadlec, Lawrence Wesley,	1880
Krusemarck, Charles,	1876
Martin, Hugo W. C.,	1881
Maynard, Henry Sherman,	1880
McPherson, George,	1865
Milleman, Philip Lionel,	1866
Moore, James Penn,	1872
Mortimer, William Golden,	1877
Parsons, John,	1865
Plautz, C. Herman,	1881
Reinhold, William,	1866
Sargent, Ezekiel Herbert,	1864
Somers, Frank Giddings.	1877
Stuart, Ennere Boyce,	1880
Sweet, Henry,	1865
Thayer, Frederick A.,	1880
Vogeler, Adolph Gustav,	1876
Wheeler, Charles Gilbert,	1876
Whitfield, Thomas,	1865
Wilson, Julius Henry,	1869
Woltersdorf, Louis,	1865
Zahn, Emil Augustus,	1881

Danville.

Winslow, Edwin Cook,	1879

Galesburg.

Clark, Albert Burr, Jr.,	1868

Greenfield.

Mook, Philip George,	1880

Highland.

Mueller, Adolphus,	1871

Mascoutah.

Henrich, George,	1875

Peoria.

Allaire, Charles Bowen,	1880
Ebert, Albert Ethelbert,	1864
Zimmermann, Charles,	1881

Peru, La Salle Co.

Hattenhauer, Robert C.,	1881

Quincy.

Schroder, Hermann,	1871

Roseville.

Brewer, Percival,	1881

Windsor, Shelby Co.

Smyser, William Christie,	1880

INDIANA.

Alexandria.

Heagy, Weems Augustus,	1880

Anderson.

Brandon, Joseph Francis,	1879
Buck, Albert Byron,	1879
Searle, Gideon Daniel,	1880

Aurora.

Marshall, Hubert Joseph,	1877
Riddell, James A.,	1879

Evansville.

Schloepfer, Henry John,	1879

Fairmount.

Edwards, Nathan Wilson,	1879

Indianapolis.

Barthels, Joseph,	1879
Beyschlag, Charles,	1880
Borst, George Frederick,	1881
Dill, J. B.,	1878
Driggs, Nathaniel S.,	1881
Earnshaw, William Jonathan,	1881
Frauer, Herman E.,	1881
Haag, Julius A.,	1879
Kielhorn, Henry,	1874
Lambert, John Albert,	1879
Lilly, Eli,	1878
Martin, Emil,	1878
Metzner, Adolph,	1879
Miller, Charles Edward,	1880
Mueller, Louis Henry,	1879
Perry, Joseph Robert,	1879
Schrader, Henry,	1869
Sloan, George White,	1857
Staley, Michael C.,	1881
Timberlake, Arthur,	1879

Jeffersonville.

Loomis, John Clarence,	1876

Kokomo.

Irvin, William Armstrong,	1879

Lafayette.

Hilt, David,	1879
Yeakel, Nathan Webb,	1879

Lawrenceburgh.

Ferris, Charles Edward,	1874

Kendallville.

Lohman, George H.,	1872

Madison.

Harper, Frank Merritt,	1874

New Albany.

Conner, Jefferson Somerville,	1876
Hoffeld, Alfred Hermann,	1879
Knoefel, August,	1879

Seymour.

Andrews, Josiah Harding,	1879

Tell City.

Schreiber, August,	1876

Terre Haute.

Baur, Jacob,	1879
Buntin, William Campbell,	1874

IOWA.

Boone.

Townsend, Abram R.,	1880

Burlington.

Wigert, Carl Reinhold,	1876

Cedar Falls, Black Hawk Co.

Bryant, William Cullen,	1881

Clinton.

Hardy, William Henry,	1881
Major, Oscar,	1880

Davenport.

Ballard, John Winthrop,	1871

Des Moines.

Weaver, Charles Augustus,	1880

Dubuque.

Ferdinand, George Adam,	1879
Ruete, Theodore William,	1870

Dyersville.

Bigelow, Israel, Jr.,	1880

Fort Dodge.

Crawford, R. W.,	1881
Oleson, Olaf Martin,	1877
Weiser, Emilius Ilgenfritz,	1880

Fort Madison.

Schafer, George Henry,	1871

Indianola.	
Buffington, Cyrus Adams,	1880
Iowa City.	
Boerner, Emil Louis,	1877
Marshalltown.	
Birchard, Abner Theodore,	1881
Covell, Thomas Jefferson,	1864
Monticello.	
Tiarks, Hermann,	1876
Newton.	
Hogin, George B.,	1881
Ottumwa, Wapello Co.	
Ennis, William W.,	1881
Prall, Delbert Elwyn,	1879
Sioux City.	
Moore, Silas Harwood,	1880
More, Arthur James,	1881

KANSAS.

Atchison.	
Chapman, Garrett A.,	1880
Frisby, Frank,	1880
Florence.	
Standford, William A.,	1881
Girard.	
Walker, George,	1881
Lawrence.	
Leis, George,	1869
Leavenworth.	
Brown, Robert J.,	1862
Peabody.	
Roberts, Daniel John,	1881
Sabetha.	
Behne, Frank J.,	1881
Salina.	
Seitz, Oscar,	1881
Stirling, Rice Co.	
Plummer, Edwin Morton,	1881
Plummer, Henry Solomon,	1881
Strong.	
McCollunn, Neil A.,	1881
Wyandotte.	
Sturtevant, T. Frank,	1880

KENTUCKY.

Bardstown.	
Venable, Richard Henry,	1879
Bowling Green.	
Burge, James Oscar,	1878
Carrollton.	
Geier, Oscar William,	1880
Catlettsburg.	
Patton, William Allison,	1873
Covington.	
Nodler, Peter,	1870
Zwick, George Gilbert,	1874
Flemingsburg.	
Reynolds, John J.,	1876
Frankfort.	
Averill, William Henry,	1874
Lewisport.	
Martin Charles C.,	1881
Louisville.	
Beckmann, Oscar Albert,	1879
Colgan, John,	1867
Davis, Vincent,	1874
Diehl, Conrad Lewis,	1863
Huddart, John Fletcher,	1870
Jones, Simon Newton,	1870
Kessler, Edward Fredrik,	1879
Miller, Frederick Christopher,	1874
Newman, George Abner,	1866
Pfingst, Edward Charles,	1874
Pfingst, Ferdinand John,	1867
Pfingst, Henry Adolph,	1874
Rademaker, Hermann Henry,	1879
Rogers, Wiley,	1874
Scheffer, Emil,	1872
Schiemann, Edward Bernard,	1880
Strassel, William,	1870
Sutton, Peter Priest,	1871
Wilder, Graham,	1868
Maysville.	
Blattermann, George Walter,	1876
Newport.	
Feth, Joseph George,	1880
Nicholasville.	
Oxley, Jefferson,	1878

Owensboro.

Courtney, William Thomas, . 1879

Shelbyville.

McKenney, Jesse Fisher, . 1878

Uniontown.

Hardigg, William L. . . 1881

LOUISIANA.

New Orleans.

Girling, Robert Nast, . . 1876
Lyons, Isaac Luria, . . . 1875

Baton Rouge.

Brooks, Francis Marion, . . 1879

New Iberia.

Lee, James Augustin, . . 1856

Plaquemine.

Dellavallade, Jean Michel, . 1873

Shreveport.

Morris, Thomas Henry, . . 1881

Thibodeaux.

Roth, Eugene Norbert, . . 1880
Thibodeaux, Joseph Theogine, . 1870

MAINE.

Augusta.

Partridge, Charles Kimball, . 1867

Bangor.

Harlow, Noah Sparhawk, . 1859
Sweet, Caldwell, . . . 1881

Bath.

Anderson, Samuel, . . . 1876

Belfast.

Moody, Richard Henry, . . 1876

Biddeford.

Boynton, Herschell, . . . 1875

Blue Hill.

Morrill, Benjamin, . . . 1876

Eastport.

Shead, Edward Edes, . . 1866

Ellsworth.

Parcher, George Asa, . . 1875

Lewiston.

Wakefield, Seth Davis, . . 1875

Portland.

Cummings, Henry Thornton, . 1853
Dana, Edmund, Jr., . . . 1877
Frye, George Carleton, . . 1879
Hay, Henry Homer, . . . 1867
Jordan, William Henry, . . 1871
Perkins, Benjamin Abbott, . 1878
Phillips, Walter Fiske, . . 1859

Waterville.

Plaisted, James Hamilton, . 1875

Yarmouth.

Richardson, James Hamilton, . 1868

MARYLAND.

Baltimore.

Baxley, Jackson Brown, . . 1856
Brack, Charles, . . . 1876
Dohme, Charles Emile, . . 1863
Dohme, Lewis, ... 1859
Donavin, Matthew Watson, . 1867
Eareckson, Edwin, . . . 1875
Elliott, Henry Alexander, . 1859
Emich, Columbus Valentine, . 1863
Frames, James Parker, . . 1868
Gosman, Adam John, . . 1870
Hancock, John Francis, . . 1863
Hassencamp, Ferdinand, . . 1872
Jackson, Vincent Rodman, . 1876
Jefferson, John Henry Bailey, . 1868
Jennings, Nathaniel Hynson, . 1857
Lauer, Michael John, . . 1865
Lautenbach, Robert, . . 1870
Monsarrat, Oscar, . . . 1856
Moore, Jacob Faris, . . . 1856
Morrison, John Ellwood, . . 1863
Muth, John Philip, . . . 1864
Perkins, Elisha Henry, . . 1857
Roberts, Joseph, . . . 1856
Russell, Eugene Janus, . . 1856
Russell, Edward Walton, . . 1863
Sappington, Richard, . . 1870
Sharp, Alpheus Phineas, . . 1855
Thompson, William Silver, . 1856
Thompson, William Partlow, . 1874
Thomsen, John Jacob, . . 1856
Tilyard, Charles Slade, . . 1867
Webb, John Alansen, . . 1870

Winkleman, John Henry,	1864
Woodward, Samuel Morris,	1874

Annapolis.

Button, Elijah,	1870

Cumberland.

Campbell, William Pendleton,	1879
Herman, John George,	1878
Shriver, Henry,	1876
Shryer, Thomas Wilson,	1875

Frederick City.

Schley, Steiner,	1878

Hagerstown.

Winter, Jonas,	1863

MASSACHUSETTS.

Boston.

Babo, Leopold,	1859
Bartlett, William Williams,	1875
Bassett, Charles Harrison,	1867
Bolles, William,	1875
Boyden, Edward Cleveland,	1874
Browne, Clarence Edward,	1880
Burley, Edward Porter,	1877
Burnett, Joseph,	1852
Campbell, Isaac Towle,	1859
Canning, Henry,	1865
Carter, Solomon,	1865
Chapin, William Amos,	1880
Colcord, Samuel Marshall,	1852
Colton, James Byers,	1865
Craig, John Smith,	1875
Cramer, Max,	1881
CUTLER, EDWARD WALDO,	1859
Davenport, Bennett Franklin,	1879
Doliber, Thomas,	1859
Drury, Linas Dana,	1871
Eaton, Charles Irving,	1867
Fowle, Henry Dearborn,	1853
French, George Washington,	1865
Godding, John Granville,	1875
Goodale, Thomas Trefethen,	1879
Groff, John E.,	1879
Hartshorn, Frederick Arthur,	1880
Hoagland, Pratt Ralph,	1867
Hoyt, George Melvin,	1875
Jenkins, Luther Lincoln,	1867
Jenks, Thomas Leighton,	1875
Jones, James Taber,	1875
Kelly, Edward Samuel,	1871
Kent, Robert Restieux,	1855
Leary, Jeremiah Thomas,	1869
Lincoln, Henry Ware,	1853
Lowd, John Colby,	1871
Luce, Edgar Henry,	1879
Markoe, George Fred. Holmes,	1863
Melvin, James Samuel,	1853
Metcalf, Theodore,	1857
O'Brien, James John,	1875
Patch, Edgar Leonard,	1872
Patten, Ichabod Bartlett,	1858
Pierce, William Herbert,	1879
Prescott, Horace Augustus,	1875
Restieaux, Thomas,	1853
Sewall, David Jewett,	1875
Sharples, Stephen Paschell,	1875
Shedd, Edwin Walter,	1879
SHEPPARD, SAMUEL AIRUS DARLINGTON,	1865
Smalley, Elijah,	1860
Snow, Jesse Walker,	1875
Stowell, Daniel,	1875
Tompkins, Orlando,	1859
Tower, Levi, Jr.,	1860
Trask, Charles Mitchell,	1875
Turner, Thompson Larkin,	1853
Underwood, Charles Gordsford,	1865
Webster, Stephen,	1875
Wilson, Benjamin Osgood,	1859
Winslow, Samuel Wallis,	1875
Woodbridge, George Washington,	1859
Wright, William Raith,	1875

Andover.

Parker, George Hawkins,	1874

Cambridge.

Hubbard, John Henry,	1866
Wood, Edward Stickney,	1879

Cambridgeport.

Bayley, Augustus Ramsey,	1859
Danforth, Edmund Culver,	1878
Orne, Joel Stone,	1859
Orne, Charles Parker,	1874
Thayer, Henry,	1858

Charlestown.

Marshall, Ernest Clifton,	1875
Stacey, Benjamin Franklin,	1860

Chelsea.

Buck, John,	1855

Danvers.

Merrill, Walter Stanley,	1875
Woodman, Warren Horton,	1881

Dedham.

Follansbee, Sherman,	1875

East Pepperell.

Dunham, Charles Sumner,	1875

Fitchburg.

Choate, John,	1877

Great Barrington.

Lillie, Charles Herbert,	1875
Whiting, Frederick Theodore,	1863

Haverhill.

Frothingham, Edward Gilman,	1875
Underhill, William Harvey,	1879

Hingham.

Hunt, James Lewis,	1865

Hinsdale.

Plummer, George Bolton,	1875

Holyoke.

Ball, Charles Ely,	1880
Morgan, Richard Evan,	1875

Lawrence.

Whitney, Henry Martyn,	1859

Lee.

Pease, Francis Merrick,	1880

Lowell.

Bailey, Frederick,	1869
Butler, Freeman Hall,	1874
Hood, Charles Ira,	1871
Kidder, Samuel, Jr.,	1859

Lynn.

Gordon, Edward Bertelle,	1875
Proctor, Benjamin,	1859

Middleboro.

Drake, Charles William,	1873

Monson.

Phipps, John Mellen,	1875

Natick.

Daniels, Samuel Olney,	1875
Reed, Frederick,	1881

New Bedford.

Blake, James Edwin,	1866
Hadley, Frank Rufus,	1872
Lawton, Charles Henry,	1873
Lawton, Horace Allen,	1873
Shurtleff, Israel Hammond,	1875
Taylor, John Pitman,	1875

Newton Centre.

Noble, John Joseph,	1875

Peabody.

Grosvenor, David P., Jr.,	1881

Pittsfield.

Atwood, Luther Lee,	1876

Quincy.

Whall, Joseph Stokes,	1873

Rockland.

Easton, Luther Waite,	1875
Estes, Joseph Josslyn,	1870

Rockport.

Blatchford, Eben,	1857

Salem.

Luscomb, William E.,	1881
Nichols, Thomas Boyden,	1876

Saugus.

Hill, James Ward Harris,	1880

Shelbourne Falls.

Baker, Edwin,	1875

Somerville.

Cowdin, George Henry,	1875
Flanagan, Lewis Cass,	1875

Springfield.

Alden, Charles Packard,	1874
Webber, Joseph Terrence,	1873

Stockbridge.

Clarke, William Bills,	1880

Walpole.

Pilsbury, Frank Otis,	1881

Waltham.

Johnson, Horace Irving,	1880
Sanderson, George Henry,	1880

Warren.

Harwood, Frank Lucian,	1875
Harwood, Lucian,	1875

West Acton.

Hutchins, Isaiah,	1880

Worcester.

Bush, William,	1875
Dinsmore, George Frederick,	1879
Fairbanks, Harlan,	1876
Scott, Nelson Ryan,	1859
Williams, Duane Burnett,	1881

MICHIGAN.

Adrian.

Ross, Ellison Halsey,	1880

Ann Arbor.

Eberbach, Ottmar,	1869
Prescott, Albert Benjamin,	1871

Battle Creek.

Wardell, Robert C.,	1860

Chelsea.

De Puy, Casper Edward,	1879

Detroit.

Caldwell, James William,	1875
Hawkins, Henry,	1880
Johnston, William,	1860
Mackimmie, George D.,	1881
Ronnefeld, Theodore,	1866
Vernor, James,	1866
Wilder, Hans Matthias,	1866

East Saginaw.

Garrigues, Samuel Smith,	1855
Melchers, Henry,	1869

Evart, Osceola Co.

Bigelow, Charles F.,	1881

Kalamazoo.

McDonald, George,	1871

Muskegon.

Jesson, Jacob,	1872

Saginaw City.

Keeler, William Henry,	1872
Moll, William,	1869

Schoolcraft.

James, George Riley,	1869

Ypsilanti.

Morgan, James,	1859

MINNESOTA.

Minneapolis.

Nienstaedt, Hermann,	1879

Faribault.

Heyerdahl, Ulrich,	1880

Mankato.

Jones, John Roger,	1881

Preston.

Weiser, Albert,	1880

St. Paul.

Simmon, Karl,	1880

MISSISSIPPI.

Aberdeen.

Tindall, Graham McFarlane,	1880

Bay St. Louis.

Deléry, Edgar,	1878

Columbus.

Frazee, George Blair,	1880

Fort Gibson.

Shreve, John A.,	1880

Jackson.

Ash, Matthew Franklin,	1856

Okolona.

Buchanan, Henry Clay,	1880

MISSOURI.

St. Louis.

Addington, William B.,	1878
Ahlbrandt, Henry Ernst,	1877
Alexander, Maurice William,	1871
Bang, Charles,	1871
Blank, Alois,	1871
Boehm, Solomon,	1871
Catlin, Ephron,	1871
Chamberlain, Guilford Tracy,	1853
Crawford, William Harper,	1864
Crawley, Francis Xavier,	1869
Curtman, Charles Otto,	1871
Drake, Robert Samuel,	1878
Featherston'h, Edward Richard,	1871
Good, James Machener,	1871
Grandjean, Charles,	1871
Grandjean, Eugene,	1871
Hemm, Francis,	1881

Jones, Charles Kendall,	1867
Kalb, Theodore,	1864
Klie, George Henry Charles,	1878
Leitch, Arthur,	1860
Mallinckrodt, Edward,	1869
Meyer, Christian Fred. Gottlieb,	1860
O'Brien, John W.,	1881
O'Gallagher, James,	1858
Oldberg, Oscar,	1873
Pauley, Frank Charles,	1879
Physick, Henry Sandford,	1870
Plumer, William S,	1879
Reichenbach, Fred'k Francis,	1879
Richardson, Joseph Clifford,	1871
Sander, Enno,	1858
Scheffer, Henry William,	1863
Scholz, Philip,	1871
Sennewald, Ferdinand William,	1865
Tomfohrde, John William,	1878
Ude, George,	1871
Uhlich, Ferdinand G.,	1881
Vardick, August Henry,	1874
Williamson, Edward John,	1876
Witte, Louis Edward,	1871

Boonville.

Sombart, John E.,	1881

Cameron.

Garrett, Oscar N.,	1881

Carthage.

Caffee, Amos Henry,	1881

Chillicothe.

Boyce, Samuel F,	1871

Columbia.

Hurt, James Francis,	1879
Webb, McHenry,	1879

Glenwood.

Gray, Gilbert D.,	1881

Hannibal.

Walker, Charles,	1881

Kansas City.

Arnold, Henry Clay,	1881
Brackett, Aurick Smith,	1868
Ford, James M.,	1881
Ford, William Thomas,	1878
Gallagher, John A.,	1881
Lahme, Charles Adolph,	1881
Love, Charles Edward,	1881
Young, Judson J.,	1881

Macon.

Field, Amos,	1871

Marshall.

Franklin, Philip H.,	1881

Mexico, Adrian Co.

Llewellyn, John Frederick,	1867

Miami, Saline Co.

Edmonds, Augustus R.,	1881

Odessa, Lafayette Co.

Beardslee, Othniel,	1881

Weston.

Parr, John Conrad,	1856

NEBRASKA.

Omaha.

Goodman, Charles Frederick,	1871
Kuhn, Norman Archibald,	1878

NEVADA.

Virginia City.

Perkins, William Alexander,	1869

NEW HAMPSHIRE.

Concord.

Eastman, Charles Smith,	1874
Underhill, George Francis,	1874

Dover.

Pinkham, Alonzo Taylor,	1874
Rackley, Benjamin Franklin,	1874
TUFTS, CHARLES AUGUSTUS,	1856
Vickery, William Henry,	1874
Wingate, Jeremiah Young,	1875

Exeter.

Merrill, Charles Augustus,	1858

Manchester.

Hubbard, George Jones,	1881
Lull, George Edward,	1881
Miville, Francis Charles,	1877
Perry, Bayard Taylor,	1876

Nashua.

Russell, Elias Smith,	1875
Wallace, Austin Edward,	1879
Whitman, Nelson Samuel,	1875

New Market.

Dearborn, George Luther, . . 1853
Twombly, John Herbert, . . 1880

Portsmouth.

Marvin, Thomas Ellison Oliver, 1875
Preston, Andrew Peabody, . 1881
Thacher, Joseph Haven, . . 1859

Rochester.

Hanson, Dominicus, . . . 1878
Sanderson, Stephen Francis, . 1880

Somersworth.

Carleton, Robert Marsh, . . 1880
Moore, George, . . . 1859

Suncook.

Hildreth, Charles Francis, . 1874

NEW JERSEY.

Belvidere.

Smith, Arthur G., . . . 1881

Bloomfield.

Scherff, John Philip, . . 1877

Bordentown.

Carslake, George Middleton, . 1880

Burlington.

Vandegrift, John A., . . 1867

Camden.

Brown, Albert Potts, . . 1870
Somers, Richard Miller, . . 1876
Test, Alfred William, . . 1870

East Orange.

Rumsey, Samuel Louis, . . 1876

Elizabeth.

Drake, Jonathan Baker, . . 1875
Kent, Henry Avery, Jr., . . 1880
Oliver, William Murray, . . 1875

Elizabethport.

Frohwein, Richard, . . . 1867

Englewood.

Rockefeller, Lucius, . . . 1880

Freehold.

Walker, Ansell, . . . 1880
Walker, John P., . . . 1881

Hackensack.

Adams, Hazen Wooster, . . 1879

Hoboken.

Eschmann, Fred'k William R., 1880
KLUSSMAN, HERMANN, . . 1876

Jersey City.

Abernethy, Maxwell, . . 1865
Dougherty, Samuel Edward, . 1875
Laird, William Rudolph, . 1867
White, George Henderson, . 1868
Wienges, Conrad, . . . 1875

Medford.

Thorn, Henry Prickett, . . 1879

Moorestown.

Worthington, Jeremiah Willits, 1873

Morristown.

Carrell, Eugene Ayers, . . 1875

Mount Holly.

Miller, Louis, ... 1874
WHITE, AARON SMITH, . . 1860

Newark.

Betzler, Jacob, ... 1880
Bruguier, Francis, . . . 1876
Dreher, Ernest, . . . 1869
Holzhauer, Charles, . . . 1873
Nichols, Edward Payson, . 1870
Post, William Henry, . . 1880
Sayre, William Henry, . . 1877
Smith, Charles Bradley, . . 1868
Smith, Israel Preston, . . 1876
Stamford, William Harrison, . 1876
Townley, William Mattison, . 1875
Vandervoord, Ransford Wells, 1870
Van Winkle, Abraham, . . 1871

New Brunswick.

Rust, William, ... 1870

Ocean Grove.

Vansant, Robert Hays, . . 1879

Orange.

Harlow, Wickham Newman, . 1874
Parsons, Robert Edwin, . . 1877
Vreeland, Cyrus Elias, . . 1880

Orange Valley.

Yatman, John Lewis, . . 1880

Plainfield.

Reynolds, Howard Prescott,	1875
Shaw, Robert Johnston,	1875
Voorhees, William Henry,	1868

Red Bank, Monmouth Co.

Lockwood, Samuel Alexander,	1880

Roselle.

Tiernan, Frank Mortimer,	1880

Salem.

Bassett, Joseph,	1880

South Amboy.

JAQUES, GEORGE WASHINGTON,	1869

Trenton.

De Cou, James Clarke,	1880
Mangold, Gustavus Adolph,	1875
Rickey, Randal,	1870

NEW YORK.

New York City.

Ambler, Starr Hoyt,	1876
Atwood, Herman White,	1873
Balluff, Paul,	1860
Balser, Gustavus,	1875
Bedford, Peter Wendover,	1859
Billings, Henry Merry,	1869
Bond, Joseph Romulus,	1876
Buehler, Edward Handy,	1874
Burdge, Jacob Uriah,	1876
Campbell, Horace Willard,	1875
Carle, John, Jr.,	1860
Cassebeer, Henry Anthony,	1858
Cassebeer, Henry Adolphus,	1872
Chandler, Charles Frederic,	1867
Chase, Charles Dyer,	1881
Colby, Albert Ladd,	1881
Collins, Louis Dell,	1880
Creuse, Jules Leon Augustine,	1871
Currie, John Harper,	1858
Davis, Benjamin,	1869
Dick, Dundas,	1879
Dieterich, William August,	1881
Ditman, Andrew J.,	1868
Drischler, Francis,	1881
Dung, Albert Charles,	1872
Eimer, Charles,	1872
Fairchild, Benjamin Thomas,	1875
Fisher, William,	1862
Fougera, Edmund Charles,	1867
Fraser, Edward Allen,	1873
Frey, John,	1865
Fridenberg, Eugene L.,	1881
Frohwein, Theobald,	1862
Gardner, Charles H.,	1881
Gardner, Robert Winthrop,	1867
Gilmore, John Wesley,	1872
Gellatly, William Adams,	1858
Gridley, Junius,	1853
Griffith, William Henry,	1874
Hale, Frederick,	1855
Hancock, John Henry,	1870
Haviland Henry,	1857
Hays, David,	1867
Hebberling Gottfried,	1867
Hegeman, J. Niven,	1880
Henes, William Frederic,	1876
Higgins, James Starkey,	1862
Hobart, Charles Henry,	1880
Hoffmann, Frederick,	1867
Horner, James Monroe,	1867
Hohenthal, Charles Frederic Leberecht,	1865
Hudnut, Alexander,	1857
Ihlefeld, Conrad H.,	1881
Inness, George,	1878
Johnson, Edward Lawless,	1860
Jungmann, Julius,	1879
Kalish, Julius,	1875
Kiersted, Henry Taylor,	1856
Kimmel, Henry,	1867
Knapp, Frank Fiero,	1880
Krehbiel, Gustavus,	1865
Laber, Julius,	1881
Lazell, Lewis T.,	1858
Lehlbach, Paul Frederick,	1872
Lehn, Louis,	1874
Linn, William Blair,	1880
Lins, Albert H.,	1881
Macmahan, Thomas Jackson,	1871
Main, Thomas Francis,	1872
Marsh, Edward H.,	1858
Massey, George.	1877
McIntyre, Byron Floyd,	1876
McIntyre, Ewen,	1873
McKesson, John, Jr.,	1867
Milhau, Edward Leon,	1858
Molwitz, Ernest,	1867

Morrison, Thomas Ormsby,	1876
Mott, Henry Augustus,	1879
Neergaard, Sidney Herbert,	1880
Newton, John,	1880
O'Neil, Henry Maurice,	1879
Osmun, Charles Alvin,	1868
Otto, Charles Henry,	1880
Page, George Sheppard,	1880
Parker, John Herbert,	1880
Parsons, Matthias W.,	1880
Peixotto, Moses Levi Maduro,	1869
Pfingsten, Gustavus,	1873
Powell, William Reuben,	1880
Reed, John H.,	1880
Reichard, Frederick Alfred,	1871
Rice, Charles,	1870
Ricksecker, Theodore,	1875
Robbins, Charles Albert,	1876
Robbins, Daniel C.,	1862
Royce, Lucien Merriam,	1866
Sands, George Gedney,	1867
Scofield, James Stephen,	1867
Seabury, George John,	1876
Shearer, Edward Young,	1880
Shedden, John William,	1859
Sheils, George Emanuel,	1860
Skelly, James Joseph,	1866
Starr, Thomas,	1870
Still, Allen Henry,	1880
Tidball, Walton Caldwell,	1881
Tscheppe, Adolph,	1876
Tuska, David,	1881
Van der Emde, Reinhold,	1879
Wanier, George Simon,	1876
Weaver, James,	1860
Weinman, Oscar Christian,	1873
Weisman, Augustus William,	1869
White, Philip Augustus,	1872
Wichelus, Frederick,	1881
Wickham, William Hull,	1870
Wilson, William,	1876
Wohlfarth, Justin,	1879
Zellhoefer, George,	1876

Brooklyn.

Aspinwall, Walter A.,	1880
Barnaby, James Otis,	1870
Bassett, Francis Morgan,	1860
Benjamin, James Henry,	1878
Booth, Clarence Frederick,	1875
Brooks, George Washington,	1879
Close, George Cassidy,	1858
Curtiss, Charles Grenville,	1866
Cutts, Foxwell Curtis, Jr.,	1875
Davis, William Mortimer,	1879
Day, Carlos Erastus,	1870
Daycock, William Henry,	1874
De Forest, William Pendleton,	1879
Dennin, Charles,	1875
Douglas, Henry, Jr.,	1875
Dudley, Oscar Earle,	1877
Dunn, John Augustus,	1867
Heydenreich, Emile,	1867
Jones, Thomas,	1868
Kitchen, Charles William,	1865
Krieger, Philip,	1876
Levy, Adolph,	1877
Livingston, Barent Van Buren,	1872
McElhenie, Thomas Diamond,	1872
Menninger, Henry Joseph,	1866
Newman, George Anthony,	1865
Nicot, Louis Emile,	1875
Niebrugge, John August,	1861
Nietsch, Adolph Frederick William,	1872
Ollif, James Henry,	1867
Owens, Richard John,	1860
Pyle, Cyrus,	1859
Raas, Francis,	1877
Ramsperger, Gustavus,	1860
Rozezlawski, Augustus Josephus,	1879
Sayre, Edward Augustus,	1877
Snyder, Ambrose Chancellor,	1867
Squibb, Edward R.,	1858
Stevens, Luther Fuller,	1879
Strachan, William Edward,	1880
Tartis, Alfred Joseph,	1867
Ubert, Julius,	1876
Underhill, Joseph James,	1879
Vincent, William,	1870
Wendler, Robert Frederick Wm.,	1876
Wynn, William,	1867

Albany.

Clement, Henry Bratt,	1880
French, William Barker,	1880
Gaus, Charles Henry,	1879
Gaus, Louis Henry,	1880
Gibson, Charles H.,	1880
Huested, Alfred Birch,	1879
McClure, Archibald,	1880
McClure, William Henry,	1880
Sauter, Louis,	1879

Turner, George Heather, . . 1880
Walker, William, . . . 1880

Angola, Erie Co.

Oatman, Le Roy Sutherland, . 1872

Auburn.

Stanley, Edgar Clark, . . 1880

Bath, Steuben Co.

Knight, George Ely, . . 1880
Dupuy, Eugene, . . . 1852

Bergen.

Fisher, Amos Sawyer, . . 1880

Binghamton.

Inloes, A. J., ... 1879

Buffalo.

Hayes, Horace Phillips, . . 1880
Lyman, Cornelius Mortimer, . 1879
Peabody, William Huntington, . 1857
Rano, Charles Orlando, . . 1866
Rieffenstahl, Julius, . . . 1879
Smither, Charles, . . . 1881
Stoddart, Thomas, . . . 1881
Tibbs, William Henry, . . 1871

Cambridge.

Williams, Richard Julius Coudray, ... 1880

Catskill.

Du Bois, William Laneman, . 1880
Dykeman, George Albert, . 1880
Mott, George Frederick, . . 1880

Croton Landing.

Henry, Charles (Dworniczak), 1881

Elmira.

Holmes, Clayton Wood, . . 1876

Fishkill on Hudson.

Moith, Augustus Theodore, . 1860

Flushing.

Hepburn, John, ... 1873

Gloversville, Fulton Co.

Miller, Jason Albert, . . 1879
Van Auken, Jerrie A., . . 1880

Greenbush.

Munger, John F., . . . 1881

Hannibal.

Brewster, Wadsworth J., . . 1880

Hudson City.

Reed, John Henry, . . . 1880

Hume, Alleghany Co.

Hopper, George S., . . . 1881

Jamaica, L. I.

Baylis, Lewis Fosdick, . . 1880
Goodale, Harvey Galusha, . 1879

Johnstown.

Cahill, John Francis, . . 1880

Lockport.

Sweet, Frederick K., . . 1880

Luzerne, Warren Co.

Miller, George Yerrington, . 1872

Malone.

Miller, Robert McClefferty, . 1880

Middletown.

KING, JAMES THEODORE, . 1859
Rogers, William Henry, . . 1859

Mount Vernon.

Gill, George, ... 1872

Newburgh.

Gorham, John Ransom, Jr., . 1879

New Lebanon.

Tilden, Henry Augustus, . . 1858

Niagara Falls.

Griffith, Hiram Elijah, . . 1875

Nyack, Rockland Co.

De Graff, David, . . . 1879

Olean.

Coon, James Van Deventer, . 1880

Oswego.

Morse, Edward Webster, . . 1880

Owego.

Napier, Henry Brewster, . . 1879

Port Chester.

Hyler, William Henry, . . 1875

Port Jervis.

Cook, George Edward, . . 1872

Potsdam.

Thatcher, Harvey Dexter, . 1865

Poughkeepsie.

Sherwood, Hezekiah Strong, . 1870

Richfield Springs.

Smith, Willard Alfred, . . 1880

Rochester.

Davis, Edward Hatch, . . 1880
Haas, G. Herman, . . . 1872
Hubachet, Joseph Henry, . 1880
Paine, James Dixon, . . 1857
Smith, Willard, . . . 1880

Rome.

Bissell, John Gordon, . . 1875
Broughton, Albert James, . 1876

Rondout.

Laycock, Washington, . . 1857

Sag Harbor.

Lobstein, Jacob Fred. Daniel, . 1868
Tooker, William Wallace, . 1879

Saratoga Springs.

Colcord, Jonathan Marshall, . 1880
Fish, Charles Frederick, . . 1866
Mingay, James, . . . 1873
Pennington, Thomas Henry Sands, ... 1877

Schenectady.

Davis, Edward L., . . . 1881
Duryee, George Elliott, . . 1880
Hanson, Willis Tracy, . . 1880

Spencerport.

Milliner, William Seward, . 1877

Stillwater, Saratoga Co.

Schermerhorn, Winfield Scott, . 1880

Syracuse.

Dawson, Edward Seymour, Jr., 1876
Snow, Charles Wesley, . . 1876

Tompkinsville, L. I.

Bassett, John William, . . 1875

Utica.

Blaikie, William, . . . 1879
Howarth, John Williams, . 1874

Wappinger's Falls.

Shrader, John L., . . . 1880

Watertown.

Packard, Durand Clarence, . 1880

Waterville, Oneida Co.

Bissell, Emery Gilbert, . . 1879

Wellsville, Alleghany Co.

Hall, Edwin Bradford, . . 1879

Yonkers.

Finkel, Charles Edwin, . . 1880
Toplis, Robert John, . . 1863

NORTH CAROLINA.

Ashville.

Lee, James Hardy, . . . 1880

Beaufort.

Davis, Josiah Benjamin, . . 1880
Mace, Francis Borden, . . 1878

Chapel Hill.

Saunders, Richard Banbury, . 1858

Fayetteville.

Hinsdale, Samuel Johnston, . 1875

Greensboro.

Porter, W. C., ... 1880

Raleigh.

Simpson, William, . . . 1873

Tarboro.

Zoeller, Edward Victor, . . 1878

Washington.

Gallagher, Charles Kewell, . 1857

Wilmington.

Hardin, John Haywood, . . 1881
McIlhenny, John K., . . 1881
Munds, James Cassidy, . . 1878

Winston.

Smith, Samuel Holmes, . . 1879

OHIO.

Cincinnati.

Bain, Andrew Watson, . . 1874
Beebe, John Walter, . . 1880
Eger, George, ... 1864
Elfers, Joseph C., . . . 1881
Faust, Charles, . . . 1879

Feemster, Joseph Hall,	1873
Fennell, Adolphus,	1864
Goodman, Emanuel,	1879
Gordon, William John Maclester,	1854
Greve, Theodore Lund August,	1864
Greyer, Julius,	1880
Heinemann, Otto,	1864
Helman, Charles Martin,	1864
Heun, Emil,	1881
Hildreth, Newton Gough,	1879
Hill, Alfred Charles,	1864
Hottendorf, Augustus,	1864
Judge, John French,	1866
Karmann, William,	1864
Koehnken, Herman Henry,	1875
Keeshan, John,	1864
Kuerze, Robert Meinrad,	1880
Lammert, C. Joseph,	1881
Lippert, Otto Carl Ferdinand,	1880
Lloyd, John Uri,	1870
Martin, William J.,	1881
Meininger, Albert,	1881
Merrell, George,	1879
Merrell, William Stanley,	1854
Phillips, Charles Wilson,	1881
Rendigs, Charles Peter,	1876
Reum, Herman Frank,	1864
Ruppert, John,	1880
Schreck, Leo S.,	1881
Schuerman, Frederick,	1881
Serodino, Herman,	1880
Thorp, Abner,	1879
Vilter, Herman,	1881
Wagner, Henry,	1876
Walton, Harry C.,	1881
Wayne, Edward Simmons,	1854
Wells, Jacob David,	1864
Yorston, Matthew Mackay,	1864

Akron.

Armstrong, Andrew Morehouse,	1876
Foltz, William Kean,	1872
Smith, Joseph Stahle,	1878

Ashtabula.

Thurber, Almon Russell,	1880

Bellefontaine.

Wallace, Archibald Collins,	1879

Bryan.

Snyder, Alva Leach,	1873

Canton.

Somers, George Horace,	1881

Chillicothe.

Howson, Walter Henry,	1875
Nipgen, John A.,	1879

Circleville.

Evans, Samuel B.,	1881

Cleveland.

Dreher, Louis,	1881
Gaylord, Henry Cleveland,	1869
Gegelein, Frederick L.,	1881
Glines, George W.,	1881
Hartness, William Henry,	1872
Hopp, Lewis Christopher,	1876
Huling, Bruce,	1872
Keiper, Louis,	1881
May, Arthur,	1881
Mayell, Alfred,	1872
Rosenwasser, Nathan,	1880
Scott, William Johnson,	1872
Spencer, Peter Ignatius,	1872
Urban, Jacob P.,	1881
Vaupel, Charles P.,	1872
Weichsel, Franz,	1881

Columbus.

Huston, Charles,	1872
Schueller, Ernst,	1881
Schueller, Frederick William,	1880

Dayton.

Weusthoff, Otto Sittell,	1879

Delphos.

Evans, Hugh W.,	1881
Wahmhoff, Julius Henry,	1880

Gallipolis.

Schaaf, Justus Henry,	1876

Hamilton.

Schwartz, John C.,	1871

Ironton.

Ball, Theophilus Benedict,	1874

Logan.

Harrington, Frank,	1869

London.

Smith, Auburn,	1880

Massillon, Stark Co.

Baltzly, Zachariah Taylor,	1876
Kirchhofer, Peter Paul,	1881

Middletown.

Johnson, Charles Brayton,	1876

Napoleon.

Leist, Jacob L.,	1881

Navarre.

Grossklaus, John Ferdinand,	1859

New Lisbon.

Pettit, Louis Clark,	1881

Saint Paris.

Chance, Samuel,	1881

Salem, Columbiana Co.

Hawkins, Michael Smith,	1870

Sandusky.

Graham, William Augustus,	1876

South Charleston.

Armstrong, George Revington,	1877

Spring Valley.

Lyon, C. Wesley,	1881

Springfield.

Casper, Thomas Jefferson,	1867
Ludlow, Charles,	1872
Troupe, Theodore,	1881

Tiffin.

Marquardt, Jacob F.,	1881

Toledo.

Hohley, Charles,	1872
Reed, I. N.,	1881

Troy.

Tobey, Charles William,	1879

Watertown.

Bohl, Conrad,	1881

West Liberty.

Kurfurst, Henry F.,	1881

Westerville.

Baumgartner, Frederick,	1880

Wilmington.

Foland, Daniel J.,	1881

Wooster.

Ohliger, Lewis Philip,	1871

Zanesville.

Graham, Willis H.,	1881
Hatton, Edgar Melville,	1878

OREGON.

Portland.

Sitton, Charles Edward,	1878

PENNSYLVANIA.

Philadelphia.

Abell, Walter B.,	1867
Angney, John R.,	1867
Bakes, William Courtney,	1864
Bauer, Louis Gustavus,	1867
Biddle, Charles Johnson,	1875
Blair, Andrew,	1865
Blair, Henry Cowen,	1868
Borell, Henry Augustus,	1874
Boring, Edwin McCurdy,	1867
Bossler, David Jervis,	1873
Bower, Henry,	1860
Bower, Henry Albert,	1868
Bowker, James,	1876
Bullock, Charles,	1857
Bunting, Samuel Sellers,	1857
Campbell, Hugh,	1876
Campbell, Samuel,	1864
Cook, Thomas Penrose,	1877
Dobbins, Edward Tompkins,	1867
Eberle, Charles Louis,	1865
Eddy, Henry Clay,	1869
Eldridge, George Washington,	1865
Ellis, Evan Tyson,	1857
England, Robert,	1868
Fox, Peter Paul,	1869
Früh, Carl Daniel Stephan,	1876
Gaillard, Edward,	1876
Genois, Louis,	1876
Gerhard, Samuel,	1873
Grahame, Israel Janney,	1856
Grove, John Eberly,	1868
Haenchen, Charles Eugene,	1865
Hance, Edward H.,	1857
Hancock, Charles West,	1868
Hassinger, Samuel Eliphat Reed,	1880
Hazlett, Edward Everett,	1876
Heintzelman, Joseph Augustus,	1858
Hoskinson, J. Thomas, Jr.,	1881
Hurst, John Corry,	1868

Jenks, William J.,	1858
Johnson, Benjamin Franklin,	1859
Jones, Alexander Henry,	1874
Jones, Daniel Sexton,	1859
Jones, Edward Charles,	1864
Kay, Isaac Henry,	1870
Keasbey, Henry Griffith,	1873
Keeney, Caleb Reynolds,	1868
Keys, Roger,	1868
Kline, Mahlon Norwood,	1876
Koch, Louis,	1872
Krewson, William Egbert,	1875
Lippincott, Henry Bascom,	1868
Magill, Benjamin Morris,	1876
MAISCH, JOHN M.,	1856
Mattern, William Kline,	1876
Mattison, Richard Vornselons,	1873
McIntyre, William,	1868
McKelway, George Irvin,	1874
Mellor, Alfred,	1864
Miller, Adolphus William,	1868
Milligan, Decatur,	1867
Moore, Joachim Bonaparte,	1860
Moorhead, William Walker,	1876
Needles, Caleb Hathaway,	1868
Newbold, Thomas Mitchell,	1876
Ottinger, James Jeremiah,	1876
Parrish, Clemmons,	1868
Parrish, Dillwyn,	1857
Patterson, James Lemon,	1876
Perot, Thomas Morris,	1857
Pile, Gustavus,	1881
Post, Elisha,	1876
Power, Frederick Belding,	1872
Preston, David,	1868
Procter, Wallace.	1874
Remington, Joseph Price,	1867
Riley, Charles William,	1868
Rittenhouse, Henry Norman,	1857
Robbins, Alonzo,	1865
Roche, Edward Manning,	1868
Roche, William Ford,	1868
Rosengarten, Mitchell George,	1869
Scattergood, George James,	1860
Shaw, Louis,	1877
Shivers, Charles,	1860
Shinn, James Thornton,	1860
Shoemaker, Joseph Leybrand,	1867
Shoemaker, Richard Martin.	1869
Shryock, Allen,	1868
Simpers, John Wilmer,	1874
Spannagel, Charles Christian,	1874
Taylor, Alfred Bower,	1852
Taylor, Henry Burnes,	1876
Thompson, William Beatty,	1858
Trimble, Henry,	1876
Troth, Samuel Fothergill,	1857
Vogelbach, Hermann Augustus,	1868
Walsh, Robert H.,	1879
Warner William Richard.	1857
Warrington, Charles Williams,	1876
Weaver, Joseph Thornton,	1868
Webb, William H.,	1867
Weber, William,	1872
Weidemann, Charles Alexander,	1868
Wendel, Henry Edward,	1873
Wiegand, Thomas Snowdon,	1857
Wright, Archibald Wesley,	1868
Zeilin, John Henry,	1859

Alleghany City.

Eggers, Frederick Hermann,	1872

Allentown.

Klump, Charles C.,	1880

Beaver, Beaver Co.

Andriessen, Hugo,	1875

Bellefonte, Centre Co.

Zeller, William S.,	1881

Bethlehem.

Luckenback, Edward Hermann,	1870
Meyers, Edward Tobias,	1867

Bristol.

Pursell, Howard,	1880

Carlisle.

Horn, Wilbur Fisk,	1876

Chambersburg.

Cressler, Charles Henry,	1868

Columbia.

Meyers, James Alfred,	1867

Danville.

Sechler, James C.,	1878

Easton.

Weaver, John Archibald,	1873

Harrisburg.

Finney, Thomas Jefferson,	1874

George, Charles Theodore, . 1873
Miller, Jacob Augustus, . . 1873

Hyde Park, Luzerne Co.

Morgan, Benjamin George, . 1876

Lancaster.

Heinitsh, Charles Augustus, . 1857

Lebanon.

Karch, Joseph Jacob, . . 1876
Lemberger, Joseph Lyon, . 1858
Redsecker; J. H , . . . 1881

Lewisburg, Union Co.

Schaffle, Samuel Wilson Wykoff, 1876

Lock Haven.

Prieson, Adolph, . . . 1880

Milton.

Alleman, Emanuel Allison, . 1880

Minersille.

Burns, John Kellar, . . 1876

New Brighton.

Kennedy, Thomas, . . . 1880
Walker, Francis William, Jr., 1878

New Wilmington.

Smenner, J. Edwin,. . . 1881

Norristown.

Poley, Francis Henry, . . 1880
Stahler, William, . . . 1880

Oil City.

Griffith, Albert Richard, . . 1870
Griffith, Alphonso de Lamartine, ... 1879

Pittsburg.

Cherry, James Bonbright, . 1868
Emanuel, Louis, . . . 1878
Holland, Samuel Smith, . . 1876
Hostetter, Charles Michael, . 1870
Kerr, James, Jr., . . . 1876

Pittston.

Rhoades, Stephen Howard, . 1876

Pottsville.

Kennedy, George Washington, 1869

Quakertown.

Penrose, Stephen Foulke, . 1871

Reading.

Raser, John Bernard, . . 1872
Stein, Jacob Henry, . . . 1869
Ziegler, Philip Milton, . . 1867

Tamaqua.

Albrecht, Emil, . . . 1875

Towanda.

Porter, Henry Carroll, . . 1880

West Chester.

Evans, Joseph Spragg, . . 1877

White Haven.

Driggs, Charles M., . . . 1881

Wilkesbarre.

Hair, James, ... 1881
Wolfe, Nathaniel, . . . 1878

Williamsport.

Cornell, Edward Augustus, . 1873
Duble, Jesse Balderston, . . 1870

York.

Patton, John Franklin, . . 1880

RHODE ISLAND.

East Greenwich.

Congdon, Albert James, . . 1860

Newport.

BLACKMAN, LYMAN RAWSON, . 1865
Taylor, James Henry, . . 1875

Niantic.

Vars, Enoch Wilcox, . . 1880

Providence.

Blanding, William Bullock, . 1875
Calder, Albert Layton, . . 1859
Cone, John Wright, . . 1876
Mason, Norman Nelson, . . 1875
Reynolds, William Keyes, . 1876

Westerley.

Latimer, Robert Fulton, . . 1857

SOUTH CAROLINA.

Aiken.

Harbers, William Henry, . 1875

Charleston.

Aimar, Charles Pons, . . 1879
Burnham, Edward S , . . 1874

Eckel, Augustus William, 1874
Gibson, William Andrew, 1874
Luhn, Gustavus Johann, 1873
Michaelis, Charles Otto, 1874
Moise, Benjamin Franklin, 1876
Panknin, Charles Frederick, 1874

Newberry Court House.

Tarrant, Homer Post, 1875

TENNESSEE.

Memphis.

Hessen, George Archibald, 1880
Robinson, James Scott, 1869
Safford, William Burr, 1875

Nashville.

Laurent, Eugene Leonard, 1872
Thomas, James. Jr., 1875
Wharton, John Criddle, 1872
Wharton, William Henry, 1876

TEXAS.

Austin.

Morley, William Jarman, 1876

Bryan.

McLelland, Robert Clayton, 1880

Clarkesville.

Harper, Harry W., 1881

Corsicana.

Campbell, John Gordon, 1879

Fort Worth.

Powell, Thomas Wallace, 1874
Wells, Ebenezer Miller, 1878

Galveston.

Thompson, Thomas Charles, 1876
Voelcker, Rudolph, 1878

Terrill.

Brown, Charles Scott, 1873

UTAH.

Salt Lake.

Seward, Richard, 1880

VERMONT.

Brandon.

Grossman, George Alvin, 1872

Burlington.

Van Patten, William James, 1876

Chester.

Pierce, Frederick Webster, 1879

Rutland.

Higgins, Albert Warren, 1870
Lewis, Elam Clark, 1870

St. Johnsbury.

Bingham, Charles Calvin, 1875
Randall, George Dallas, 1875

Vergennes.

Young, John Edward, 1875

Windsor.

Paine, Milton Kendall, 1875

VIRGINIA.

Fredericksburg.

Hall, Marshall Carter, 1870

Norfolk.

Masi, Frederick Henry, 1873

Richmond.

Baker, Thomas Roberts, 1873
Blunt, Ira Washington, 1873
Bodeker, Henry, 1873
Purcell, John Barry, 1875
Scott, Albert Augustus, 1873
Scott, William Henry, 1873

WASHINGTON TERRITORY.

Walla Walla.

Holmes, Henry Elliott, 1880

WEST VIRGINIA.

Charleston, Kanawha Co.

Boggs, Edwin Leslie, 1872

Wheeling.

Boeking, Edmund, 1874
Gray, William Howlett, 1880
McCullough, Winfield Scott, 1880
Mœnkemœller, Charles, 1880
Nagle, Asher Christian, 1881
Williams, William H., 1880
Young, Alexander Thomas, 1876

WISCONSIN.

Beloit.

Fenton, Frank S., 1881

Evansville, Rock Co.

Griswold, Dewitt C., 1881

Fond du Lac.

Huber, Jacob Charles, 1880

Geneva.

Miner, Morris Ashbel, 1880

Geneva Lake.

Arnold, Robert Bruce,	1879

Janesville.

Heimstreet, Edward Burton,	1874
Prentice, Fred. F.,	1876

Kenosha.

Robinson, Frederick,	1881

Menasha.

Bates, Augustin, E.,	1881

Milwaukee.

Abbott, Frank,	1880
Bantly, Bartholomew,	1881
Conrath, Adam,	1881
Dadd, John Alfred,	1880
Drake, John Ransom,	1860
Schrank, Henry Charles,	1876
Senier, Frederick Sutherland,	1874

Neillsville.

Sniteman, Charles C.,	1881

Watertown.

Eberle, Herman Theodore,	1875

Whitewater.

Warne, Henry Lee,	1881

DOMINION OF CANADA.

NOVA SCOTIA.

Halifax.

Simson, Francis Cook,	1876

ONTARIO.

Goodrich.

Jordan, Frederick Francis,	1877

Guelph.

Harvey, Edmund,	1877

Lindsay.

Gregory, Edmund,	1875

London.

Saunders, William,	1860

Simcoe.

Foster, William Orville,	1881

Stratford.

Waugh, George James,	1862

Toronto.

Henderson, John,	1877
Hodgetts, George,	1877
Johnson, Stuart William,	1881
Knowles, Harvey Armage,	1877
Lander, John Cambridge,	1877
Lowden, John,	1875
Pearce, James H.,	1880
Robinson, William Sherlock,	1877
Rose, Henry John,	1872

Wingham.

Bray, William Thomas,	1881

QUEBEC.

Montreal.

Evans, Henry Sugden,	1880
Giroux, Edmund,	1878
Gray, Henry Robert,	1867

Quebec.

McLeod, Roderick,	1880

BERMUDA.

Hamilton.

Heyl, James B.,	1863

U. S. OF COLOMBIA.

Guatemala.

Herbruger, Florence Charles,	1876

MEMBERS RESIDING IN EUROPE.

Burroughs, Silas Mainvielle, London, England,	1876
Morris, Lemuel Iorwerth, Strassburg, Germany,	1880
Slocum, Frank Leroy, Strassburg, Germany,	1880
Wellcome, Henry Solomon, London, England,	1875

ALPHABETICAL LIST OF ACTIVE MEMBERS.

Abbott, Frank, Milwaukee, Wis.
Abell, Walter B., cor Frankford and Girard avenues, Philadelphia, Pa.
Abernethy, Maxwell, No. 188 Newark avenue, Jersey City, N. J.
Adams, Hazen W., 73 Main street, Hackensack, N. J.
Addington, William B., 700 Olive street, Mo.
Ahlbrandt, Henry E., S. E. cor Fifteenth and Cass streets, St. Louis, Mo.
Aimar, Charles P., 469 King street, Charleston, S. C.
Albrecht, Emil, Tamaqua, Pa.
Alden, Charles P., No. 270 Main street, Springfield, Mass.
Alexander, Maurice W., S. E. cor. Fourth and Market streets, St. Louis, Mo.
Allaire, Charles B , 108 Main street, Peoria, Ill.
Alleman, Emanuel A., care of Cyrus Brown, Milton, Pa.
Ambler, Starr Hoyt, No. 36 Vesey street, N Y.
Anderson, Samuel, No. 48 Front street, Bath, Me.
Andrews, Josiah H., S. E. cor Chestnut and Second streets, Seymour, Ind.
Andriessen, Hugo, P. O Box 39, Beaver, Beaver County, Pa.
Angney, John R , cor. Fifth and Spruce streets, Philadelphia, Pa.
Armstrong, Andrew M., No. 106 East Market street, Akron, O.
Armstrong, George R., No. 2 Union Block, South Charleston, O.
Arnold, Henry C., Kansas City, Mo.
Arnold, R. Bruce, cor. Main and Broad streets, Geneva Lake, Wis.
Ash, Matthew F., P. O. Box 129, Jackson, Miss.
Aspinwall, Walter A., 1147 and 1149 Fulton street, Brooklyn, N. Y.
Atwood, Herman W., No. 856 Broadway, New York.
Atwood, Luther L., No. 7 North street, Pittsfield, Mass.
Avery, Archibald, 73 Peachtree street, Atlanta, Ga.
Averill, William H., 435 Main street, Frankfort, Ky.
Babo, Leopold, No. 12 Boylston street, Boston, Mass.
Bailey, Frederick, P. O. Box 314, Lowell, Mass.
Bain, Andrew W., City Hospital, Cincinnati, O.
Baker, Edwin, Bridge street, Shelbourne Falls, Mass.
Baker, George M., 487 Manhattan avenue, Brooklyn, N. Y.
Baker, T. Roberts, No. 919 East Main street, Richmond, Va.
Bakes, William C , 145 N. Tenth street, Philadelphia, Pa.
Ball, Charles E., 221 High street, Holyoke, Mass.
Ball, Theophilus B., No. 105 Second street, Ironton, O.
Ballard, John W., No. 106 West Second street, Davenport, Iowa.
Balluff, Paul, No. 655 Sixth avenue, New York.
Balser, Gustavus, No. 137 Avenue B, New York.
Baltzly, Zacharias T., Opera Block, Massillon, O.
Bang, Charles, No. 1429 Franklin avenue, St. Louis, Mo.
Bantly, Barthol., Milwaukee, Wis.

Barnaby, James O., No. 700 Fulton street, Brooklyn, N. Y.

Bartells, George C., Camp Point, Ill.

Barthels, Joseph, S. E. cor. Noble and Bates streets, Indianapolis, Ind.

Bartlett, Nicholas G., N. W. cor. Twenty-third street and Indiana avenue, Chicago, Ill.

Bartlett, William W., No. 189 High street, Boston, Mass.

Bassett, Charles H., No. 504 Washington street, Boston, Mass.

Bassett, Francis M., cor. Atlantic ave. and Court street, Brooklyn, N. Y

Bassett, John W., Tomkinsville, L. I., N. Y.

Bassett, Joseph, No. 119 Market street, Salem, N. J.

Bates, Aug. E., Milwaukee, Wis

Bauer, Louis G., cor. Fifth and Fairmount avenue, Philadelphia, Pa.

Baumgartner, Frederick, 701–703 Main street, cor. Seventh, Westerville, O.

Baur, Jacob, Terre Haute, Ind.

Baxley, J. Brown, cor. Howard and Franklin streets, Baltimore, Md.

Bayley, Augustus R., No. 607 Main street, Cambridgeport, Mass.

Baylis, Lewis F., P. O. box 34, Jamaica, Queens County, L. I.

Beardslee Othniel, Odessa, Lafayette Co., Mo.

Becker, Charles, No. 138 High street, Georgetown, D. C.

Beckmann, Oscar A., 686 Broadway, cor. Baxter avenue, Louisville, Ky.

Bedford, P. Wendover, No. 10 Gold street, New York.

Beebe, John Walter, Court and Plum streets, Cincinnati, O.

Behne, Frank J., Sabetha, Kan.

Belt, Z James, No. 601 Market street, Wilmington, Del

Benjamin, James H., No. 493 Tompkins avenue, Brooklyn, N. Y.

Berrian, Geo. W., Washington, D. C.

Best, John, No. 1 German Block, Central City, Col.

Betts, Howard S., cor. Main and Wall streets, Norwalk, Conn.

Betzler, Jacob, 121 Union street, Newark, N. J.

Beyschlag, Charles, Indianapolis, Ind.

Biddle, Charles Johnson, No. 3348 Market street, Philadelphia.

Bigelow, Charles F., Evart, Osceola Co., Mich.

Bigelow, Israel J., Main street, Dyersville, Iowa.

Billings, Henry M., No. 278 Greenwich street, New York.

Bingham, Charles C., No. 5 Bank Block, Main street, St. Johnsbury, Vt.

Birchard, Abner T., Marshalltown, Iowa.

Biroth, Henry, No. 111 Archer avenue, Chicago, Ill.

Bissell, Emery G., Main street, Waterville, Oneida County, N. Y.

Bissell, John G., 45 Dominick street, Rome, N. Y.

Blackman, Lyman R., No. 167 Thames street, Newport, R. I.

Blahnik, Lorenz, 88 West Eighteenth street, Chicago, Ill.

Blaikie, William, 202 Genesee street, Utica, N. Y.

Blair, Andrew, cor Eighth and Walnut streets, Philadelphia, Pa.

Blair, Henry C., cor. Eighth and Walnut streets, Philadelphia, Pa.

Blake, James E., No. 64 North Second street, New Bedford, Mass.

Blanding, William B., Nos. 54 and 58 Weybosset street, Providence, R. I.

Blank, Alois, No 1353 South Fifth street, St. Louis, Mo.

Blatchford, Eben, No. 32 Main street, Rockport, Mass.

Blatterman, George W., cor. Second and Court streets, Maysville, Kentucky.

Blocki, William F., No. 85 South Clark street, Chicago, Ill.

Blunt, Ira W., Inner Court, between Eleventh and Twelfth and Main and Cary streets, Richmond, Va.

Bocking, Edmund, No. 1 Odd Fellows' Hall, Wheeling, W. Va.

Bodeker, Henry, cor. Fifteenth and East Main streets, Richmond, Va.

Boehm, Solomon, No. 800 Morgan street, St. Louis, Mo.

Boerner, Emil L., Haas Block, Clinton street, Iowa City, Ia.

Boggs, Edwin L., Kanawha Bank Building, Charleston, Kanawha Co., W. Va.

Bohl, Conrad, Watertown, O.

Bolles, William P., No. 571 Dudley street, Boston, Mass.

Bond, Joseph R., New York.

Booth, Clarence F., No. 128 Hall street, Brooklyn, N. Y.

Borell, Henry A., No. 2043 Chestnut street, Philadelphia, Pa.

Boring, Edwin M., cor. Tenth and Fairmount ave., Philadelphia, Pa.

Borland, Matthew W., No. 378 West Van Buren street, Chicago, Ill

Borst, George F., 440 S. Meridian street, Indianapolis, Ind.

Bossler, David J., No. 5186 Germantown avenue, Philadelphia, Pa.

Bower, Henry, cor. Gray's Ferry road and Twenty-ninth street, Philadelphia, Pa.

Bower, Henry A., cor. Sixth and Green streets, Philadelphia, Pa.

Bowker, James, cor. Sixth and Vine streets, Philadelphia, Pa.

Boyce, Samuel F., west side of Public Square, Chillicothe, Mo.

Boyden, Edward C., corner of Joy and Myrtle streets, Boston, Mass.

Boynton, Herschell, No. 74 Main street, Biddeford, Maine.

Brack, Charles, cor. Ensor and Forrest streets, Baltimore, Md.

Brackett, Aurick S., Tenth and Broadway, Kansas City, Mo.

Bradfield, L. H., cor. Decatur and Pryor streets, Atlanta, Ga.

Brandon, Joseph F., 18 E. Anderson street, Anderson, Ind.

Bray, William F., Wingham, Ontario, Can.

Brewer, Percival, Roseville, Ill.

Brewster, Wadsworth J., Hannibal, N. Y.

Bristol, Charles E , 48 Main street, Ansonia, Conn.

Brooks, F. M., Baton Rouge, La.

Brooks, George W., 1161 Myrtle avenue, Brooklyn, N. Y.

Broughton, Albert J., No. 64 Dominick street, Rome, N. Y.

Brown, Albert P., cor. Fifth and Federal streets, Camden, N J.

Brown, Charles S., care of A. D. Edwards, Terrell, Texas.

Brown, Joseph J., P. O. Box 1312 San José, Cal.

Brown, Robert J., Leavenworth, Kansas.

Browne, Clarence E., 39 Harrison avenue, Boston, Mass.

Bruguier, Francis, No. 557 Market street, Newark, N. J.

Brunner, Norman I., cor. Fourth and Arch streets, Macon, Ga.

Bryant, William C., Cedar Falls, Black Hawk Co., Ia.

Buchanan, Henry C., north side Main street, Okolona, Miss

Buck, Albert B., Anderson, Ind.

Buck, George, S. W. cor. State and Madison streets, Chicago, Ill.

Buck, John, Nos. 104 and 106 Winnisimmet street, Chelsea, Mass.

Buehler, Edward H., No. 170 William street, New York.

Buffington, Cyrus A., Hotel Block, Indianola, Ia.

Bullard, George S , No. 98 Genesee street, Utica, N. Y.

Bullock, Charles, No. 528 Arch street, Philadelphia, Pa.

Buntin, William C., No. 600 Main street, Terre Haute, Ind.

Bunting, Samuel S., cor. Tenth and Spruce streets, Philadelphia, Pa.

Burdge, Jacob U., No. 482 Seventh avenue, New York.

Burge, James O., Bowling Green, Ky.

Burley, Edwin P., No. 43 Temple Place, Boston, Mass.

Burnett, Joseph, No. 27 Central street, Boston, Mass.

Burnham, Edward S , Charleston, S. C.

Burns, J. Kellar, cor. Sunbury and Lecona streets, Minersville, Pa.
Burroughs, Silas M., 8 Snowhill, London, England.
Bury, Edward B., No. 412 Eighth street, S. E., Washington, D. C.
Bush, William, No. 56 Front street, Worcester, Mass.
Butler, Freeman H., No. 141 Central street, Lowell, Mass.
Button, Charles E., 1558 Wabash avenue, Chicago, Ill.
Button, Elijah, No. 40 Hanover street, Annapolis, Md.
Cabell, George W., 211 Central avenue, Hot Springs, Arkansas.
Caffee, Amos H., Carthage, Mo.
Cahill, John F., 119 Main street, Johnstown, N. Y.
Calder, Albert L., No. 163 Westminster street, Providence, R. I.
Caldwell, James W., No. 242 Grand River avenue, Detroit, Mich.
Calvert, John. S. E. cor. Kearny and Clay streets, San Francisco, Cal
Campbell, Horace W., No. 84 Front street, New York.
Campbell, Hugh, cor. Twenty-first and Locust streets, Philadelphia, Pa.
Campbell, Isaac T., No. 239 West Broadway, Boston, Mass.
Campbell, J. G., Corsicana, Texas.
Campbell, Samuel, No. 1412 Walnut street, Philadelphia, Pa.
Campbell, William P., 61 Baltimore street, Cumberland, Md.
Candidus, Philip C., cor. Dauphin and Cedar streets, Mobile, Ala.
Canning, Henry, No. 90 Green street, Boston, Mass.
Carleton, Robert M., Somersworth, N. H.
Carle, John, Jr., No. 153 Water street, New York.
Carrell, Eugene A., Washington street, Morristown, N. J.
Carslake, George M., S. W. cor. Farnsworth and Church streets, Bordentown, N. J.
Carter, Solomon, No. 355 Washington street, Boston, Mass.
Casper, Thomas J., No. 41 East Main street, Springfield, O.
Cassebeer, Henry A., No. 57 Fourth avenue, New York.
Cassebeer, Henry A., Jr., No. 57 Fourth avenue, New York.
Catlin, Ephron, cor. Sixth street and Washington avenue, St. Louis, Mo.
Chamberlain, Guilford T., N. E. cor. Ninth and Chambers streets, St. Louis, Mo.
Chance, Samuel, Saint Paris, O.
Chandler, Charles F., cor. Fourth avenue and Fiftieth street, New York.
Chapin William A., cor. Beach and Lincoln streets, Boston, Mass.
Chapman, Garrett A., Atchison, Kansas.
Chase, Charles D., 7 Gold street, New York.
Chase, John B., Aurora, Ill.
Cherry, James B., No. 23 Fourth avenue, Pittsburg, Pa.
Choate, John, No. 208 Main street, Fitchburg, Mass.
Christiani, Charles, No. 484 Pennsylvania avenue, Washington, D. C.
Clark, Albert B., Jr., No. 9 Main street, Galesburg, Ill.
Clarke, William B., Stockbridge, Mass.
Clement, Henry B., Nos. 684 and 686 Broadway, Albany, N. Y.
Close, George C., cor. Smith and Schermerhorn streets, Brooklyn, N. Y.
Coffin, Samuel L., No. 2727 State street, Chicago, Ill.
Colby, Albert L., 66 East One Hundred and Twenty-seventh street, New York.
Colcord, Jonathan M., Saratoga, New York.
Colcord, Samuel M., Dover, Mass.
Colgan, John, cor. Tenth and Walnut streets, Louisville, Ky.
Collins, Louis D., No. 280 Greenwich street, New York.
Colton, James B., No. 766 Tremont street, Boston, Mass.
Cone, John W., No. 52 Wey Vossel street, Providence, R. I.

Congdon, Albert J , Main street, East Greenwich, R. I.

Conner, Jefferson S., No. 121 Pearl street, New Albany, Ind.

Conrath, Adam, Milwaukee, Wis.

Cook, George E., No. 111 Pike street, Port Jervis, N. Y.

Cook,Thomas P., No. 838 North Ninth street, Philadelphia, Pa.

Coon, James V. D., No. 81 Union street, Olean, N. Y.

Cornell, Edward A., cor. Pine and Tenth streets, Williamsport, Pa.

Courtney, William T., Rudd's Block, Ann street, Owensboro, Ky.

Covell, Thomas J , Marshalltown, Ia.

Cowdin, George H., No. 25 Union Square, Somerville, Mass.

Cowdrey, Robert H., 527 State street, cor. Harmon court, Chicago, Illinois.

Craig, John S , Neponset avenue, Neponset, Boston, Mass.

Cramer, Max, 1336 Tremont Street, Boston, Mass.

Crawford, R. W , Fort Dodge, Ia.

Crawford, William H., No. 800 Washington avenue, St. Louis, Mo.

Crawley, Francis X., No. 2301 Carr street, St. Louis, Mo.

Cressler, Charles H., S. W. cor. Front and Main streets, Chambersburg, Pa.

Creuse, Jules L. A., No. 36 Beekman street, New York.

Cromwell, Zachariah S., No. 480 Pennsylvania avenue, Washington, D.C.

Crossman, George A., No 2 Simonds's Block, Brandon, Vt.

Cummings, Henry T., No. 696 Congress street, Portland, Me.

Currie, John H., No. 206 East Twenty-ninth street, New York.

Curry, Daniel W., Odeon Hall Building, Cartersville, Ga.

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Curtman, Charles O., No 3718 North Ninth street, St. Louis, Mo.

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Cutts, Foxwell C., Jr., No. 965 Fulton street, Brooklyn, N. Y.

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Dale, William M., cor. Clark and Madison streets, Chicago, Ill.

Dana, Edmund, Jr., No. 373 Congress street, Portland, Me.

Danforth, Edmund C., No. 607 Main street, Cambridgeport, Mass.

Daniels, John B., No. 13 Decatur street, Atlanta, Ga.

Daniels, Samuel O., cor. Main and Summer streets, Natick, Mass.

Davenport, Bennett F., No. 751 Tremont street, Boston, Mass.

Davis, Benjamin, No. 466 Grand street, New York.

Davis, Edward H., Rochester, New York.

Davis, Ed. L., Schenectady, N. Y.

Davis, Josiah B., Beaufort, N. C.

Davis, Vincent, cor. Sixth and Chestnut streets, Louisville, Ky.

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Daycock, William H., No. 649 Bedford avenue, Brooklyn, N. Y.

De Cou, James C., No. 44 E. State street, Trenton, N. J.

De Forrest, William P., Fifth avenue, corner Dean street, Brooklyn, New York.

De Graff, David, Nyack, Rockland Co., N. Y. (No. 3 Broadway.)

De Puy, Caspar E., N. W. cor. Main and Middle streets, Chelsea, Michigan.

Dearborn, George L., No. 156 Main street, New Market, N. H.

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Dick, Dundas, No. 37 Wooster street, N. Y.
Diehl, C. Lewis, cor. Third and Broadway, Louisville, Ky.
Dieterich, William A., 756 Tenth avenue, New York.
Dikeman, Nathan, cor. Leavenworth and Dikeman streets, Waterbury, Ct.
Dill, J. B., Indianapolis, Ind.
Dinsmore, George F., No. 41 Park street, Worcester, Mass.
Ditman, Andrew J., No. 10 Astor House, New York.
Dobbins, Edward T., No. 1412 Walnut street, Philadelphia, Pa.
Dohme, Charles E., cor. Pratt and Howard streets, Baltimore, Md.
Dohme, Louis, cor. Pratt and Howard streets, Baltimore, Md.
Doliber, *Thomas*, No. 39 Tremont street, Boston, Mass.
Donavin, Matthew W., cor. Lee and Sharp streets, Baltimore, Md.
Dougherty, Samuel E , No. 65 Brinkerhoff street, Jersey City, N J.
Douglass, Henry, Jr., No. 68 Wythe avenue, Brooklyn, N. Y.
Drake, Charles W., 275 Main street, Middleboro, Mass.
Drake, Jonathan B., No. 132 Broad street, Elizabeth, N. J.
Drake, John R., No 255 S. Water street, Milwaukee, Wis.
Drake, Robert S., station 6, Elleandville, St. Louis, Mo.
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Dreher, Louis, 302 Euclid avenue, Cleveland, O.
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Driggs, Nathaniel S., Indianapolis, Ind.
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Drury, Linus D., cor. Warren and Dudley streets, Boston, Mass.
Duble, Jesse B., cor. Pan and Fourth streets, Williamsport, Pa.
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Dudley, Oscar E., No. 423 Fulton street, Brooklyn, N. Y.
Dufour, Clarence R., No. 1814 Fourteenth street, Washington, D. C.
Dung, Albert C., No 61 Bowery, N.Y.
Dunn, John A., No. 56 Dougherty street, Brooklyn, N. Y.
Dupuy, *Eugene*, Bath, Steuben Co., N. Y.
Duryee, George E., 191 State street, Schenectady, N. Y.
Dykeman, George A., Catskill, N. Y.
Eareckson, Edwin, cor. Baltimore and High streets, Baltimore, Md.
Earnshaw, William J., 38 Huron street, Indianapolis, Ind.
Eastman, Charles S., N. E. cor. Main and Depot streets, Concord, N. H.
Easton, Luther W., Union near Webster street, Rockland, Mass.
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Eberbach, Ottmar, No. 12 South Main street, Ann Arbor, Mich.
Eberle, Charles L., No. 4779 Germantown avenue, Philadelphia, Pa.
Eberle, Herman T., care G. E. Eberle & Son, Watertown, Wis.
Ebert, Albert E., Peoria Sugar Refinery, Peoria, Ill.
Eckel, Augustus W., 231 King street, Charleston, S. C.
Eddy, Henry C , cor. Eighteenth and Lombard streets, Philadelphia, Pa.
Edmonds, Augustus R., Miami, Saline Co., Mo.
Edwards, Nathan W., Main street, Fairmount, Ind.
Eger, George, Nos 839 and 841 Central avenue, Cincinnati, O.
Eggers, Frederick H., No. 72 Ohio street, Alleghany City, Pa.
Eimer, Charles, No. 205 Third avenue, New York.

Eisele, Martin A , Hot Springs, Ark.

Elbe, Constantine B., care J. A. Baur, 101 Post street, San Francisco, Cal.

Eldridge, George W., cor. Seventh and Thompson streets, Philadelphia, Pa.

Elfers, Joseph C , 42 Budd street, Cincinnati, O.

Elliott, Henry A., No. 286 Lexington street, Baltimore, Md.

Ellis, Evan T., No. 133 S. Front street, Philadelphia, Pa.

Emanuel, Louis, cor. Second and Grant streets, Pittsburg, Pa.

Emich, Columbus V., No. 136 North Howard street, Baltimore, Md.

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Evans, Hugh W., Delphos, O.

Evans, Joseph S., P. O Box 657, West Chester, Pa.

Evans, Samuel B., Circleville, O.

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Fairbanks, Harlan, cor. Southbridge and Myrtle streets, Worcester, Mass.

Fairchild, Benjamin T., cor. Broadway and Twenty-fifth street, New York.

Fale, John, care of John Fale & Co , Hawkinsville, Ga.

Faust, Charles, S. E. cor. Elm and Liberty streets, Cincinnati, O.

Featherston'h, Edward R., 1203 Chouttan avenue, St. Louis, Mo.

Feemster, Joseph H., No. 99 Walnut street, Cincinnati, O.

Fell, Theron E., Bloomington, Ill.

Fennel, Adolphus, cor. Eighth and Vine streets, Cincinnati, O.

Fenner, William R., care of W. D. Hoyt & Co., Rome, Ga.

Fenton, Frank S., Beloit, Wis.

Ferdinand, George A., Dubuque, Ia.

Ferguson, Robert B., corner Second street and Pennsylvania avenue, Washington, D. C.

Ferris, Charles E., Lawrenceburg, Indiana.

Feth, Joseph G., cor. Madison and Columbia streets, Newport, Ky.

Field, Amos, No. 26 Vine street, Macon, Mo.

Finger, Henry J., Santa Barbara, Cal.

Finkel, Charles E , No. 4 Main street, Yonkers, N. Y.

Finney, Thomas J., No. 300 Boas street, Harrisburg, Pa.

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Fish, Charles F., No. 104 Broadway, Saratoga Springs, N. Y.

Fisher, Amos S., Bergen, N. Y.

Fisher, William, No. 488 Hudson street, New York.

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Flint, John H., Marysville, Cal.

Foland, Daniel J., Wilmington, O.

Follansbee, Sherman, Dedham, Massachusetts.

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Ford, James M., Kansas City, Mo.

Ford, W. Thomas, 1305 Cherry street, Kansas City, Mo.

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Frisby, Frank, Atchison, Kansas.

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Frohwein, Theobald, No. 218 Stanton street, New York.

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Früh, Carl D. S., 2321 Ridge avenue Philadelphia, Pa.

Frye, George C., 320 Congress street, Portland, Me.

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Fuller, Oliver F., No. 24 Market street, Chicago, Ill.

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Gale, William H, No. 85 South Clark street, Chicago, Ill.

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Gallagher, John A., Kansas City, Missouri.

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Gardner, Robert W., New York city.

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Gates, Howard E., Litchfield, Ct.

Gates, Amasa O., Morrisville, Vt.

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Gaus, Louis H., 254 South Pearl street, Albany, N. Y.

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Gegelein, Frederick L., Payne and Case avenues, Cleveland, O.

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Genois, Louis, No. 1412 Walnut street, Philadelphia, Pa.

George, Charles T, No. 1306 North Third street, Harrisburg, Pa.

Gerhard, Samuel, cor. Hanover and Belgrade streets, Philadelphia, Pa.

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Goodman, Charles F., No. 180 Farnham street, Omaha, Neb.

Goodman, Emanuel, cor. Sixth and Elm streets, Cincinnati, O.

Goodrich, Stephen, care of L. G. Moses & Co., Hartford, Conn.

Goodwin, Lester H., cor. State and Main streets, Hartford, Conn.

Gordon, Edward B., No. 73 Broad street, Lynn, Mass.

Gordon, William J. M., No. 142 Walnut street, Cincinnati, O.

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Gosman, Adam J., cor. Charles and Mulberry streets, Baltimore, Maryland.

Graham, William A., No. 30 Columbus avenue, Sandusky, O.

Graham, Willis H., Zanesville, O.

Grahame, Israel J., cor. Twelfth and Filbert streets, Philadelphia, Pa.

Grandjean, Charles, No. 2828 North Fourteenth street, St. Louis, Mo.

Grandjean, Eugene, No. 2828 North Fourteenth street, St. Louis, Mo.

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Gray, William Howlett, 1139 Market street, Wheeling, W. Va.

Greene, Charles H., 36 Wall street, Atlanta, Ga.

Gregory, Edmund, Kent street, Lindsay, Ontario, Can.

Greve, Theodore L. A., cor. John and Sixth streets, Cincinnati, O.

Greyer, Julius, S. W. cor. Vine and Findlay streets, Cincinnati, O.

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Grieve, Fleming G , Lunatic Asylum, Milledgeville, Ga.

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Griffith, Alphonzo De L., No. 33 Centre street, Oil City, Pa.

Griffith, Hiram E., Grant's Block, Niagara Falls, N. Y.

Griffith, William H., No. 1230 Third avenue, New York.

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Grosvenor, David P., Jr., Peabody, Mass.

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Haenchen, Charles E., No. 3838 Haverford street, Philadelphia, Pa.

Haight, William B., care Lockwood & Haight, Bogardus, Stamford, Conn.

Hair, James, Wilkesbarre, Pa.

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Hall, Edwin B., Wellsville, Alleghany County, N. Y.

Hall, Marshall C., care of Hall Brothers, Fredericksburg, Va.

Hall, Roland B., No. 90 Cherry street, Macon, Ga.

Hallberg, Carl S. N., No. 25 Michigan avenue, Chicago, Ill.

Hamilton, Emil, 3037 Indiana avenue, Chicago, Ill.

Hance, Edward H., cor. Callowhill and Marshall streets, Philada , Pa.

Hancock, Charles W., No. 3425 Spring Garden street, Philadelphia, Pa.

Hancock, John F., cor. Baltimore and Caroline streets, Baltimore, Maryland.

Hancock, John Henry, care of Reed & Carnick, New York city.

Hanson, Dominicus, Central Square, Rochester, N. Y.

Hanson, Willis T., 195 State street, Schenectady, N. Y.

Harbers, William H., Laurens street, Aiken, S. C.

Hardigg, William L., Second near Main streets, Uniontown, Ky.

Hardin, John H., Wilmington, North Carolina.

Hardy, William H., Clinton, Iowa.

Harlow, Noah S., No. 4 Smith's Block, Bangor, Me.

Harlow, Wickham N., No. 219 Main street, Orange, N. J.

Harper, Frank M., No. 45 East Main street, Madison, Ind.

Harper, Harry W., Clarkesville, Tex.

Harrington, Frank, Werland's Block, Main street, Logan, O.

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Harwood, Lucien, Main street, Warren, Mass.

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Hattenhauer, Robert C., Peru, La Salle Co , Ill.

Hatton, Edgar M., cor. Main and Fifth streets, Zanesville, O.

Haviland, Henry, New York,

Hawkins, Henry, cor. Hastings and Brewster streets, Detroit, Mich.

Hawkins, Joseph T., N. W. cor. Dearborn and Minor streets, Mobile, Ala.

Hawkins, M. Smith, No. 20 Broadway, Salem, Columbiana Co., O.

Hay, Henry H., cor. Free and Middle streets, Portland, Me.

Hayes, Horace P., 312 Elk street, Buffalo, N. Y.

Hays, David, No. 207 Division street, New York city.

Hazlett, Edward E., S. E. cor. Norris and Mervine streets, Philadelphia, Pa.

Heagy, Weems A., Harrison street, Alexandria, Ind.

Hebberling, Gottfried, No. 695 Seventh street, New York.

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Heimstreet, Edward B., care of S. Heimstreet & Son, Janesville, Wis.

Heinemann, Otto, cor. Laurel and Lynn streets, Cincinnati, O.

Heinitsh, Charles A., No. 16 East King street, Lancaster, Pa.

Heintzelman, Joseph A., No 2010 Ridge avenue, Philadelphia, Pa.

Helman, Charles M., cor. Findlay and Baymiller streets, Cincinnati, O.

Hemm, Francis, South St. Louis, Mo.

Henderson, John, Toronto, Can.

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Henrich, George, cor. Mill and Jefferson streets, Mascoutah, Ill.

Henry, Charles (Dworniczak), Croton Landing, N. Y.

Hepburn, John, No. 93 Main street, Flushing, N. Y.

Herbruger, Florence C., Guatemala, U. S. of Colombia.

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Hildreth, Newton G., Cheviot, Cincinnati, Ohio.

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Hoffmann, Frederick, No. 797 Sixth avenue, New York.

Hogan, Louis C., cor. Forty-seventh and State streets, Chicago, Ill.

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Hogin, George B., Newton, Ia.

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Hohly, Charles, No. 248 South St. Clair street, Toledo, O.

Holland, Samuel P., cor. Smithfield and Liberty streets, Pittsburg, Pa.

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Holmes, Henry E., No. 19 Main street, Walla Walla, Washington Territory.

Holzhauer, Charles, No. 787 Broad street, Newark, N. J.

Hood, Charles I., cor. Merrimac and Central streets, Lowell, Mass.

Hooper, John H., No. 171 North Clark street, Chicago, Ill.

Hopp, Lewis C., cor. Euclid avenue and Erie street, Cleveland, O.

Hopper, George E., Hume, Alleghany Co., N. Y.

Horn, Wilbur F., No. 32 West Main street, Carlisle, Pa.

Horner, James M., New York city.

Hoskinson, J. Thomas, Jr., Front and Norris streets, Philadelphia, Pa.

Hostetter, Charles M., No. 272 Penn avenue, Pittsburg, Pa.

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Howson, Walter H., Water street, Chillicothe, O.

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Hubachek, Joseph H., 2 Lyell avenue, Rochester, N. Y.

Huber, Jacob C., 450 Main street, Fond du Lac, Wis.

Hubbard, George J., Manchester, N. H.

Hubbard, John H., No. 468 Harvard street, Cambridge, Mass.

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Huling, Bruce, No. 109 Ontario street, Cleveland, O.

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Hunt, Leonard W., Fourth street, Macon, Ga.

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James, George R., No. 120 Grand street, Schoolcraft, Mich.

Jefferson, John H. B., No. 96 South Broadway, Baltimore, Md.

Jenkins, Luther L., No. 119 Leverett street, Boston, Mass.

Jenks, Thomas L., Merriman and Traverse streets, Boston, Mass.

Jenks, William J., No. 160 North Third street, Philadelphia, Pa.

Jennings, N. Hynson, No. 90 North Charles street, Baltimore, Md.

Jesson, Jacob, cor. Western avenue and Jefferson street, Muskegon, Mich.

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Johnson, Charles B., Third street, Middletown, O.

Johnson, Edward L., Tenth avenue, cor. One Hundred and Fifty-seventh street, New York.

Johnson, Horace J., 1 Rumford Building, Main street, Waltham, Mass.

Johnson, Stuart W., Toronto, Ont., Can.

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Jones, Charles K., Leffingwell and Washington avenue, St. Louis, Mo.

Jones, Daniel S., Twelfth and Spruce streets, Philadelphia, Pa.

Jones, Edward C., S. E. cor. Fifteenth and Market sts., Philadelphia, Pa.

Jones, James T., No. 855 East Fourth street, Boston, Mass.

Jones, John R., Mankato, Minn.

Jones, Simon N., First and Jefferson streets, Louisville, Ky.

Jones, Thomas, Nos. 1060 and 1062 Fulton street, Brooklyn, N. Y.

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Kalb, Theodore, Second and Poplar streets, St. Louis, Mo.

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Keiper, Louis, 780 Lorain street, Cleveland, O.

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Kelsey, Henry J., No. 37 Gove street, New Haven, Conn.

Kennedy, George W., No. 103 North Centre street, Pottsville, Pa.

Kennedy, Thomas, Broadway, New Brighton. Pa.

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Kent, Robert R., No. 7 Winthrop Block, Boston, Mass.

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Kessler, Edward F., cor. Twentieth and Markets streets, Louisville, Ky.

Keys, Roger, Twelfth and Pine streets, Philadelphia, Pa.

Kidder, Samuel, Jr., No. 38 Nesmith street, Lowell, Mass.

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Kiersted, Henry T., 200 W. 125th street, cor Seventh avenue, New York.

Kimmel, Henry, No. 65 Avenue A, New York.

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Kline, Mahlon N., No. 309 and 311 North Third st., Philadelphia, Pa.

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Knapp, Frank F., No. 362 Hudson street, New York.

Knight, George E., No. 12 Liberty street, Bath. N. Y.

Knoefel, August, New Albany, Ind.

Knowles, Henry A., No. 463 Yonge street, Toronto, Can.

Koch, Louis, cor. Fourth and Wood streets, Philadelphia, Pa.

Koehnken, Herman H., cor. Third and Mill streets, Cincinnati, O.

Krehbiel, Gustavus, No. 243 East Houston street, New York.

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Krieger, Philip, cor. Myrtle and Marcey streets, Brooklyn, N. Y.

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Lander, John C., Yorkville, Toronto, Can.

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Lauer, Michael J., No. 275 Mulberry street, Baltimore, Md.

Laurent, Eugene L., No. 27 Cedar street, Nashville, Tenn.

Lautenbach, Robert, cor. Eutaw and Saratoga streets, Baltimore, Maryland.

Lawton, Charles H., No. 91 Union street, New Bedford, Mass.

Lawton, Horace A., No. 91 Union street, New Bedford, Mass.

Laycock, Washington, No. 44 Union avenue, Rondout, N. Y.

Lazell, Lewis T., No. 10 Gold street, New York

Leary, Jeremiah T., No. 239 West Broadway, Boston, Mass.

Lee, James A., Main street, New Iberia, La.

Lee, James H., Court Square, Ashville, N. C.

Lehlbach, Paul F., No. 782 West Twenty-second street, New York.

Lehn, Louis, No. 160 William street, New York.

Leis, George, No. 90 Massachusetts street, Lawrence, Kan.

Leist, Jacob L., Napoleon, O.

Leitch, Arthur, care of E. Shendell, St. Louis, Mo.

Lemberger, Joseph L., No. 8 North Ninth street, Lebanon, Pa.

Lengfeld, Abraham L., cor. Gay and Stockton streets, San Francisco, California.

Levy, Adolph, No. 125 Grand street, E. D., Brooklyn, N. Y.

Lewis, Elam C., No. 2 West, cor. Merchants' row, Rutland, Vt.

Lewis, Samuel E., Fourteenth and P streets, N. W., Washington, D. C.

Lillie, Charles H., Main street, Great Barrington, Mass.

Lilly, Eli, No. 36 South Meridian street, Indianapolis, Ind.

Lincoln, Henry W., No. 185 Warren street, Boston, Mass.

Linn, William B , cor. Waverly Place and Christopher streets, Northern Dispensary, New York city.

Lins, Albert H , 86 Second avenue, New York.

Lippert, Otto C. F., No. 1009 Central avenue, Cincinnati, O.

Lippincott, Henry B., cor. Twentieth and Cherry streets, Philadelphia, Pa.

Little, James, Harrisonburg, Va.

Livingston, Barent V. B., No 306 Broadway, Brooklyn, N. Y.

Llewellyn, John F., west side Public street, Mexico, Adrian Co , Mo.

Lloyd, John U., cor. Court and Plum streets, Cincinnati, O.

Lobstein, J. F. Daniel, Main street, Sag Harbor, N. Y.

Lockwood, Samuel A., cor. Broad and White streets, Red Bank, Monmouth Co., N. J.

Lohman, George H , No. 1 Mitchell's Block, Kendallville, Ind.

Loomis, John C., cor. Chestnut and Wall streets, Jeffersonville, Ind.

Love, Charles E , 544 Main Street, Kansas City, Mo.

Lowd, John C., No. 43 Temple Place, Boston, Mass.

Lowden, John, No. 18 De Breseles street, Toronto, Can.

Luce, Edgar H , No. 61 Warren street, Boston, Mass.

Luckenback, Edward H., No. 3 Broad street, Bethlehem, Pa.

Ludlow, Charles, No. 55 East Main street, Springfield, O.

Luhn, Gustavus J , P. O. Box 582, Charleston, S. C.

Lull, George E., Manchester, N. H.

Luscomb, Will. E., 310 Essex street, Salem, Mass.

Lyman, C. M , Buffalo, N. Y.

Lyon, C. Wesley, Spring Valley, O.

Lyons, Isaac L., Nos. 42 and 44 Camp street, New Orleans, La.

McCalunn, Neil A., Strong, Kan.

McClure, Archibald, Nos. 74 and 76 State street, Albany, N. Y.

McClure, William H., Nos. 74 and 76 State street, Albany, N. Y.

McCollough, Winfield S., No. 1346 Jacob street, Wheeling, W. Va.

McConville, Thomas A., Pio Nono College, Macon, Ga.

McElhenie, Thomas D., No. 259 Ryerson street, Brooklyn, N. Y.

McIlhenny, John K., Wilmington, N C.

McIntyre, Byron F., No. 99 North Moore street, New York.

McIntyre, Ewen, 874 Broadway, N.Y.

McIntyre, William, No. 2229 Frankford avenue, Philadelphia, Pa.

McKelway, George J., No. 1410 Chestnut street, Philadelphia, Pa.

McKenney, Jesse F., Shelbyville, Ky.

McKesson, John, Jr., No. 91 Fulton street, New York.

McKinnie, George D., Detroit, Mich.

McLeod, Roderick, Quebec, Canada.

McLelland, Robert C., Main street, Bryan, Texas.

McPherson, George, Chicago, Ill

Macdonald, George, No. 106 Main street, Kalamazoo, Mich.

Mace, F. Bordon, Front street, Beaufort, N. C.

Mack, Adolph, 11 Front street, San Francisco, Cal.

Macmahon, Thomas J., No. 142 Sixth avenue, New York.

Magill, Benjamin M., cor. Seventeenth and Columbia avenue, Philadelphia, Pa.

Main, Thomas F., No. 278 Greenwich street, New York.

MAISCH, JOHN M., No. 143 North Tenth street, Philadelphia, Pa.

Major, John R., No. 800 Seventh street, Washington, D. C.

Major, Oscar, Clinton, Iowa.

Mallinckrodt, Edward, cor. Mallinckrodt and Main sts., St. Louis, Mo.

Mangold, Gustavus A., No. 4 East State street, Trenton, N. J.

Markoe, George F. H., cor. Warren and Dudley streets, Boston, Mass.

Marquardt, Jacob F., Washington street, Tiffin, O.

Marsh, Edward H., No. 10 Gold street, New York.

Marshall, Ernest C., No. 51 Vine street, Charlestown, Mass.

Marshall, Hubert J., S. W. cor. Second and Main streets, Aurora, Ind.

Martin, Charles C., Lewisport, Kentucky.

Martin, Emil, Russell avenue and South Meridian street, Indianapolis, Ind.

Martin, Hugo W. C., Chicago, Ill.

Martin, William J., Cincinnati, O.

Marvin, Thomas E O., Nos. 36 and 38 Bow street, Portsmouth, N. H.

Masi, Frederick H., Main and Granby streets, Norfolk, Va

Mason, Norman N., No. 129 North Main street, Providence, R. I.

Massey, George, care of Lanman & Kemp, New York.

Mattern, William K., No. 2540 Germantown avenue, Philadelphia, Pa.

Mattison, Richard V., No. 332 North Front street, Philadelphia, Pa.

May, Arthur F., Cleveland, O.

May, James O., Post-office Block, Water street, Naugatuck, Conn.

Mayell, Alfred, cor. Euclid avenue and Erie street, Cleveland, O.

Maynard, Henry S., No. 626 West Lake street, Chicago, Ill.

Meininger, Albert, 163 McMiskey avenue, Cincinnati, O.

Melchers, Henry, cor. Genesee and Jefferson streets, East Saginaw, Mich.

Mellor, Alfred, No. 218 North Twenty-second street, Philadelphia, Pa.

Melvin, James S., No. 43 Temple Place, Boston, Mass.

Menninger, Henry J., No. 79 Sands street, Brooklyn, N. Y.

Merrell, George, No. 5 West Fifth street, Cincinnati, O.

Merrell, William S., No. 5 West Fifth street, Cincinnati, O.

Merrill, Charles A., No. 52 Water street, Exeter, N. H.

Merrill, Walter S., Maple street, Danvers, Mass.

Metcalf, Theodore, No. 29 Tremont street, Boston, Mass.

Metzner, Adolph, No. 94 East Washington street, Indianapolis, Ind.

Meyer, Christian F. G., No. 8 North Second street, St. Louis, Mo.

Meyers, Edward T., No. 16 Main street, Bethlehem, Pa.

Meyers, James A., Odd Fellows' Hall, Columbia, Pa.

Michaelis, Charles O., cor. King and Cannon streets, Charleston, S. C.

Milburn, John A., No. 1101 F street, N W., Washington, D. C.

Milhau, Edward L., No. 183 Broadway, New York.

Milleman, Philip, cor. Milwaukee avenue and Division street, Chicago, Ill.

Miller, Adolphus W., cor. Third and Callowhill streets, Philadelphia, Pa.

Miller, C. E., cor. Illinois and Market streets, Indianapolis, Ind.

Miller, Frederick C., cor. Clay and Market streets, Louisville, Ky.

Miller, George Y., No. 2 River street, Luzerne, Warren Co., N. Y.

Miller, Jacob A , cor. Second and Chestnut streets, Harrisburg, Pa.

Miller, Jason A , Gloversville, Fulton Co., N. Y.

Miller, Louis, No. 49 High street, Mount Holly, N J.

Miller, Robert McCleferty, Malone, N. Y.

Milligan, Decatur, No. 509 North Second street, Philadelphia, Pa.

Milliner, William T., Union street, Spencerport, N. Y.

Miner, Maurice A., Wisconsin street, Geneva, Wis.

Mingay, James, No. 472 Broadway, Saratoga Springs, N. Y.

Miville, Francis C., No. 1023 Elm street, Manchester, N. H.

Moenkemoeller, Charles, cor. Twenty-second and Market streets, Wheeling, W. Va.

Moffit, Thomas S., 322 Clay street, San Francisco, Cal.

Mohr, Charles, No. 177 Dauphin street, Mobile, Ala.

Moise, Benjamin F., No. 130 Meeting street, Charleston, S. C.

Moith, Augustus T., No. 1 Ferry street, Fishkill, N. Y.

Moll, William, cor. Court and Hamilton streets, Saginaw City, Michigan.

Molwitz, Ernest, No. 966 Sixth avenue, New York.

Monsarrat, Oscar, No. 113 South Broadway, Baltimore, Md.

Moody, Richard H., cor. Main and High streets, Belfast, Me.

Mook, Philip G., 7 North Side Square, Greenfield, Ill.

Moore, George, No. 26 Market street, Somersworth, N. H.

Moore, J. Faris, Howard and Madison streets, Baltimore, Md.

Moore, James P., No. 62 Lake street, Chicago, Ill.

Moore, Joachim B., Thirteenth and Lombard streets, Philadelphia, Pa.

Moore, Silas H., 80 Fourth street, Sioux City, Iowa.

Moore, Thomas F , Mobile, Ala.

Moore, Arthur J., Sioux City, Ia

Moorhead, William W., No. 818 Arch street, Philadelphia, Pa.

Morgan, Benjamin G., Main and Jackson streets, Hyde Park, Pa.

Morgan, James, Ypsilanti, Mich.

Morgan, Richard E., No. 135 High street, Holyoke, Mass.

Morley, William J., No. 207 East Pecan street, Austin, Texas.

Morrill, Benjamin, Blue Hill, Me.

Morris, Lemuel I., 3 Broglie Platz, Strassburg, Germany.

Morris, Thomas H., Shreveport, La.

Morrison, J. Ellwood, No. 25 Sharp street, Baltimore, Md.

Morrison, Thomas O., No. 166 Eighth avenue, New York.

Morse, Edward Webster, Oswego, N. Y.

Mortimer, William G , Chicago, Illinois.

Mott, George F., Catskill, Greene Co., N. Y.

Mott, Henry A., Jr., No. 117 Wall street, New York.

Mueller, Adolphus, Cherry street, Highland, Ill.

Mueller, Louis H., 249 East Washington street, Indianapolis, Ind.

Munds, James C., Third street, Wilmington, N. C.

Munger, John F., 361 Broadway, Greenbush, N. Y.

Munson, Luzerne J., Apothecaries' Hall, Waterbury, Conn.

Murray Francis M., Lenni, Delaware Co., Pa.

Muth, John P., Nos. 14 and 16 German street, Baltimore, Md.

Nagle, Asher C., Bridge street, Wheeling, W. Va.

Napier, Henry B., Owego, N. Y.

Needles, Caleb H., cor. Twelfth and Race streets, Philadelphia, Pa.

Neergaard, Sidney H., 1183 Broadway, New York city.

Newbold, Thomas M., 4160 Chestnut street, Philadelphia, Pa.

Newman, Alcuin E., Hot Springs, Arkansas.

Newman, George A., cor. Fifth and Walnut streets, Louisville, Ky.

Newman, George A., No. 380 Myrtle avenue, Brooklyn, N. Y.

Newton, John, 36 Beekman street, New York city.

Nichols, Edward P., No. 901 Broad street, Newark, N. J.

Nichols, Thomas B., No. 159½ Essex street, Salem, Mass.

Nicot, Louis E., No. 65 Union avenue, Brooklyn, N. Y.

Niebrugge, John A., No. 506 Bedford avenue, Brooklyn, N. Y.

Nienstaedt, Hermann, Minnesota Soap Co., Minneapolis, Minn.

Nietsch, Adolph J. W., Harrison avenue and Walton street, Brooklyn, N. Y.

Nipgen, John A., Chillicothe, Ohio.

Noble, John J., Centre and Pelham streets, Newton Centre, Mass.

Nodler, Peter, N. E. cor. Fifth and Madison streets, Covington, Kentucky.

Oatman, Le Roy S., 5 Commercial street, Angola, Erie County, N. Y.

Oberdeener, M., Santa Clara, Cal.

O'Brien, James J., No. 53 Kneeland street, Boston, Mass.

O'Brien, John W., 1727 Cass avenue, St. Louis, Mo.

O'Donnel, James D., No. 751 Eighth street, Washington, D. C.

O'Gallagher, James, No. 2325 Broadway, St. Louis, Mo.

O'Neil, Henry M., No. 463 Hudson street, New York, N. Y.

Ohliger, Lewis P., No. 23 West Liberty street, Wooster, O.

Oldberg, Oscar, St. Louis, Mo.

Oleson, Olaf M., Market street, Fort Dodge, Ia.

Oliver, William M., No. 132 Broad street, Elizabeth, N. J.

Ollif, James H., No. 855 Fulton street, Brooklyn, N. Y.

Orne, Charles P.. No. 493 Main street, Cambridgeport, Mass.

Orne, Joel S., No. 493 Main street, Cambridgeport, Mass.

Osgood, Hugh H., No. 148 Main street, Norwich, Conn.

Osmun, Charles A., No. 13 Seventh avenue, New York.

Ottinger, James J., No. 1412 Walnut street, Philadelphia, Pa.

Otto, Charles H., 157 Prince street, New York city.

Owens, Richard J., cor. Myrtle and Spencer streets, Brooklyn, N. Y.

Oxley, Jefferson, Nicholasville, Ky.

Packard, Durand C., 91 Fulton street, New York, and Watertown, New York

Page, George S , 10 Warren street, New York.

Paine, James D., No. 18 Buffalo street, Rochester, N. Y.

Paine, Milton K., cor Main and State streets, Windsor, Vt.

Painter, Emlen, cor. Clay and Kearney streets, San Francisco, Cal.

Palmer, John D., cor Public Square and Cherry streets, Monticello, Flo.

Panknin, Charles F., No. 123 Meeting street, Charleston, S. C.

Parcher George A., Main street, Ellsworth, Me.

Parker, George H., Draper's Block, Main street, Andover, Mass.

Parker, John H., Sixth avenue near One Hundred and Twenty-fourth street, New York city.

Parr, John C., Main street, Weston, Mo.

Parrish, Clemmons, No. 27 Park Place, New York.

Parrish, Dillwyn, No. 1017 Cherry street, Philadelphia, Pa.

Parsons, John, No. 684 Wabash avenue, Chicago, Ill.

Parsons, Mathias W., Towanda, Pa.

Parsons, Robert E., No. 19 Main street, Orange, N. J.

Partridge, Charles K., Granite Block, Augusta, Me.

Patch, Edgar L., No. 90 Green street, Boston, Mass.

Patten I. Bartlett, No. 39 Harrison street, Boston, Mass.

Patten, John Franklin, York, Pa.

Patten, William A., Division street, Catlettsburg, Ky.

Patterson James L., cor. Twenty-first street and Ridge avenue, Philadelphia, Pa.

Pauley, Frank C., cor. Eastern street, and Compton avenue, St. Louis, Mo.

Peabody, William H, No. 8 South Division street, Buffalo, N. Y.

Peacock, Frederick S., No. 102 Whitehall street, Atlanta, Ga.

Pearce, James H., 19 Front street, W. Toronto, Canada.

Pease, Francis M., Lee, Mass.

Peixotto, Moses L. M , No. 543 Fifth avenue, New York.

Pennington, T. H. Sands, No 400 Broadway, Saratoga, N. Y.

Penrose, Stephen F., S E.. cor. Main and Broad streets, Quakertown, Pa.

Perkins, Benjamin A., 74 and 76 Commercial street, Portland, Me.

Perkins, Elisha H, cor. Greene and Baltimore streets, Baltimore, Maryland.

Perkins, William A., No. 213 Main street, Virginia City, Nev.

Perot T. Morris, No 1810 Pine street, Philadelphia, Pa.
Perry, Bayard T., No. 1088 Elm street, Manchester, N. H.
Perry, Joseph R., 20 North Pennsylvania street, Indianapolis, Ind.
Pettingill, Edward T., G. and Twenty-first street, N. W., Washington, D.C.
Pettit, Louis C., New Lisbon, O.
Pfingst, Edward C., cor. Third and Breckenridge streets, Louisville, Ky.
Pfingst, Ferdinand J., cor. Twentieth and Market streets, Louisville, Ky.
Pfingst, Henry A., cor. Eleventh and Market streets, Louisville, Ky.
Pfingsten, Gustavus, No. 6 Whitehall street, New York.
Phelps, Dwight, opposite Methodist Church, West Winstead, Conn.
Phillips, Charles W., 484 Eastern avenue, Cincinnati, O.
Phillips, Walter F., Nos. 134, 136, and 138 Middle street, Portland, Me.
Phipps, John M., Day's Block, Main street, Monson, Mass.
Physick, Henry S., No. 810 Olive street, St. Louis, Mo.
Pierce, Frank W., Main st., Chester, Vt.
Pierce, William H., 2147 Washington street, Boston, Mass.
Pile, Gustavus, 770 Passyunk avenue, Phila., Pa.
Pilsbury, Frank O , Walpole, Mass.
Pinkham, Alonzo T., Franklin Square, Dover, N. H.
Pinson, John L., Atlanta, Ga.
Pitt, John R., Jr., No. 218 Main street, Middletown, Conn.
Plaisted, James H., Main street, Waterville, Me.
Plautz, C. Herman, 709 Milwaukee avenue, Chicago.
Plummer, David G., No. 6 Main street, Bradford, Stark Co., Ill.
Plummer, Edwin M., Sterling, Rice Co., Kan.
Plummer, George B., Water street, Hinsdale, Mass.
Plummer, Henry S., Sterling, Rice Co., Kansas.
Plummer, William L., St. Louis, Mo.
Plummer, William P., Bradford, Stark Co., Ill.
Poley, Francis H , No. 8 West Main sts., Norristown, Montg'y Co., Pa.,
Pollard, Frank W., Hot Springs, Ark.
Porter, Henry C., cor. Main & Pine sts., Towanda, Pa.
Porter, W. C., Greensboro, N. C.
Post, Elisha, cor. Main and Pine streets, Athens, N. Y.
Post, William H , 21 Ferry street, Newark, N. J.
Powell, Robert B., Eureka, Humboldt Bay, California.
Powell, Thomas W., No. 10 Houston street, Fort Worth, Texas.
Powell, William R., 91 Fulton street, New York city.
Power, Frederick B., 145 North Tenth street, Philadelphia, Pa.
Prall, Delbert E., Ottumwa, Ia.
Prentice, Fred. F., opposite Post-office, Janesville, Wis.
Prescott, Albert B., University of Michigan, Ann Arbor, Mich.
Prescott, Horace A., 307 Washington street, Boston, Mass.
Preston, Andrew P., State street, Portsmouth, N. H.
Preston, David, cor. Ninth and Lombard streets, Philadelphia, Pa.
Prieson, Adolph, Main and Desper streets, Lock Haven, Pa.
Procter, Wallace, cor. Ninth and Lombard streets, Philadelphia, Pa.
Proctor, Benjamin, No. 6 Healey's Arcade, Lynn, Mass.
Punch, William F., 71 Dauphin street, Mobile, Ala.
Purcell, John B., No. 1216 East Main street, Richmond, Va.
Pursell, Howard, S. W. cor. Mill and Cedar streets, Bristol, Pa.
Pyle, Cyrus, No. 326 Fulton street, Brooklyn, N. Y.
Raas, Francis, Union and Hoyt streets, Brooklyn, N. Y.
Rackley, Benjamin F., Franklin Square and Charles st., Dover, N. H.
Rademaker, Hermann H., cor. Madison and Shelby sts., Louisville, Ky.

Ramsperger, Gustavus, No. 703 Fulton street, Brooklyn, N. Y.

Randall, George D., Railroad street, St. Johnsbury, Vt.

Rankin, Charles F., No 123 Meeting street, Charleston, S. C.

Rankin, Jesse W., Decatur and Pryor streets, Atlanta, Ga.

Rano, Charles O., No. 1872 Niagara street, Buffalo, N. Y.

Rapelye, Charles A., No. 605 Main street, Hartford, Conn.

Raser, John B., No. 164 North Eighth street, Reading, Pa.

Redsecker, J. H., Lebanon, Pa.

Reed, Frederick, Natick, Mass.

Reed, I. N., 139 Summit street, Toledo, O.

Reed, John H., 488 Hudson street, New York city.

Reichardt, F. Alfred, No. 45 Maiden lane, New York city.

Reichenbach, Fred. F., N. W. cor. Fifth and Market streets, St. Louis, Mo.

Reinhold, William, No. 146 North Clark street, Chicago, Ill.

Reinlein, Paul, Washington, D. C.

Remington, Joseph P., cor. Thirteenth and Walnut streets, Philadelphia, Pa.

Rendings, Charles P., cor. Spring and Abigail streets, Cincinnati, Ohio.

Renouff, James T., Main street, Winstead, Conn.

Restieaux, Thomas, No. 29 Tremont street, Boston, Mass.

Reum, Hermann F., cor. Fifth and Broadway, Cincinnati, Ohio.

Reynolds, Howard P., cor. Front and Cherry streets, Plainfield, N. J.

Reynolds, John J., Flemingsburg, Ky.

Reynolds, William K., No. 354 Friendship street, Providence, R. I.

Rhoades, Stephen H., No. 88 Main street, Pittston, Pa.

Rice, Charles, Bellevue Hospital, New York.

Richardson, J. Clifford, No. 704 North Main street, St. Louis, Mo.

Richardson, James H , No 52 Lake street, Chicago, Ill.

Ricker, George D., No. 178 Salem street, Boston, Mass.

Ricksecker, Theodore, No. 146 William street, New York.

Rickey, Randal, No. 157 North Green street, Trenton, N. J.

Riddell, James A., Aurora, Ind.

Rieffenstahl, Julius, Buffalo, N. Y.

Riley, Charles W., No. 1115 Race street, Philadelphia, Pa.

Rittenhouse, Henry N., No. 218 North Twenty-second street, Philadelphia, Pa.

Robbins, Alonzo, cor. Eleventh and Vine streets, Philadelphia, Pa.

Robbins, Charles A., No. 91 Fulton street, New York.

Robbins, Daniel C., No. 91 Fulton street, New York.

Roberts, D. J., Peabody, Kan.

Roberts, Joseph, cor. Harford and Greenmount avenue, Baltimore, Md.

Robinson, Frederick, Kenosha, Wisconsin

Robinson, James S , cor. Second and Madison streets, Memphis, Tenn.

Robinson, William S., Yorkville, Toronto, Can.

Roche, Edward M., No. 611 South Fifteenth street, Philadelphia, Pa.

Roche, William F., cor. Twentieth and South streets, Philadelphia, Pa.

Rockefeller, Lucius, Palisade avenue, Englewood, N. J.

Rogers, Wiley, cor. Fifteenth and Chestnut streets, Louisville, Ky.

Rogers, William H., North street, Middletown. N. Y.

Rollins, John F., Fort George, Fla.

Ronnefeld, Theodore, No. 195 Gratiot street, Detroit, Mich.

Rose, Henry J., cor. Yonge and Queen streets, Toronto, Ont., Can.

Rosengarten, Mitchell G , cor. Seventeenth and Fitzwater streets, Philadelphia, Pa.

Rosenwasser, Nathan, No. 112 Superior street, Cleveland, O.

Ross, Ellison H., Adrian, Mich.

Roth, Eugene N., Market street, between Green and St. Louis streets, Thibodeaux, La.

Royce, Lucien M., No. 91 Fulton street, New York.

Rozezlawski, Augustus, cor. Gates and Classon avenues, Brooklyn, New York.

Ruete, Theodore W., No. 379 Main street, Dubuque, Iowa.

Rumsey, Samuel L., cor. Main street and Arlington avenue, East Orange, N. J.

Runyon, Edward W., care of Redington & Co., San Francisco, Cal.

Ruppert, John, Cincinnati, O.

Russell, E. Walter, cor. Baltimore and Eutaw streets, Baltimore, Md.

Russell, Elias S , No. 69 Main street, Nashua, N. H.

Russell, Eugene J., cor. Army street and Canton avenue, Baltimore, Md.

Rust, William, No. 7 Peace street, New Brunswick, N. J.

Safford, William B., cor. Vance and Hernando streets, Memphis, Tenn.

Sander, Enno, cor. Nineteenth and S. Eleventh streets, St. Louis, Mo.

Sanderson, George H., No. 295 Main street, Waltham, Mass.

Sanderson, Stephen Francis, Rochester, N. Y.

Sands, George G., No. 4 Vanderbilt avenue, New York.

Sappington, Richard, No. 131 North Gay street, Baltimore, Md.

Sargent, Ezekiel H., No. 125 State street, Chicago, Ill.

Saunders, Richard B., Chapel Hill, N. C.

Saunders, William, London, Ontario, Can.

Sautter, Louis, cor. South Pearl and Plain streets, Albany, N. Y.

Savage, Thomas J., Mobile, Ala.

Sayre, Edward A., No. 461 Myrtle avenue, Brooklyn, N. Y.

Sayre, William H., cor. Warner and Orange streets, Newark, N. J.

Scala, William Franklin, No. 50 East Capitol street, Washington, D. C.

Scattergood, George J., No. 413 Spruce street, Philadelphia, Pa.

Schaaf, Justus H , cor. Second and Pine streets, Gallipolis, O.

Schafer, George H., No. 129 Front street, Fort Madison, Iowa.

Schaffle, Samuel W. W., Market street, Lewisburg, Pa.

Schafhirt, Adolph J., cor. First and H streets, Washington, D. C.

Scheffer, Emil, No. 145 Market street, Louisville, Ky.

Scheffer, Henry W., No. 209 Myrtle street, St. Louis, Mo.

Scherff, John P., Glenwood avenue and Washington street, Bloomfield, N. J.

Schermerhorn, Winfield S., Main street, Stillwater, Saratoga Co., N.Y.

Schiemann, Edward B., cor. M and Walnut streets, Louisville, Ky.

Schley, Steiner, No. 16 West Patrick street, Frederick City, Md.

Schloepfer, Henry J., cor. Main and Second streets, Evansville, Ind.

Scholtz, Edmund L., Denver, Col.

Scholz, Philip, No. 3627 Broadway, St. Louis, Mo.

Schrader, Henry, No. 74 East Washington street, Indianapolis, Ind.

Schranck, Henry C., Nos. 437 and 439 East Water street, Milwaukee, Wisconsin.

Schreck, Leo S., 114 John street, Cincinnati, O.

Schreiber, August, Odd Fellows' Hall, Eighth street, Tell City, Ind.

Schroder, Hermann, No. 525 Main street, Quincy, Ill.

Schueller, Ernst, 231 S. High street, Columbus, O.

Schueller, Frederick W., 190 and 192 S. High street, Columbus, O.

Schuerman, F., Cincinnati, O.

Schumann, P. J., Whitehall and Hunter streets, Atlanta, Ga.

Schumann, Theodore, cor. Whitehall and Hunter streets, Atlanta, Ga.

Schwartz, John C., Hamilton, O.

Scofield, James S., Ninth avenue & 57th street, New York.

Scott, Albert A., No. 2422 Broad street, Richmond, Va.

Scott, Nelson R, cor. Main and Southridge streets, Worcester, Mass.

Scott, William H., No. 1617 Seventeenth street, Richmond, Va.

Scott, William J., No 257 Prospect street, Cleveland, O.

Seabury, George J., No. 21 Platt street, New York.

Searle, Gideon D, Anderson, Ind.

Sechler, James C, No. 201 Mill street, Danville, Pa.

Seitz, Oscar, Salina, Kan.

Senier, Frederick S., No. 1164 Humboldt avenue, Milwaukee, Wis.

Sennewald, Ferdinand W., No. 800 Hickory street, St. Louis, Mo.

Serodino, Herman, Cincinnati, O.

Sevin, N. Douglass, No. 141 Main street, Norwich, Conn.

Sewall, David J., Dorchester avenue and Adams street, Boston, Massachusetts.

Seward, Richard, Salt Lake, Utah.

Sharp, Alpheus P, cor. Pratt and Howard streets, Baltimore, Maryland.

Sharples, Stephen P., No. 114 State street, Boston, Mass.

Shaw, Lewis, Cheyenne, W. T.

Shaw, Robert J., No. 3 East Front street, Plainfield, N. J.

Shead, Edward E, No. 8 Water street, Eastport, Me.

Shearer, Edward Y., No. 1103 Second avenue, New York city.

Shedd, Edwin W., No. 61 Warren street, Boston, Mass.

Shedden, John W, No. 1275 Broadway, New York.

Sheils, George E., No. 896 Broadway, New York.

SHEPPARD, SAMUEL A. D., No. 1129 Washington street, Boston, Massachusetts

Sherwood, Hezekiah S., Poughkeepsie, N. Y.

Shinn, James T., cor. Broad and Spruce streets, Philadelphia, Pennsylvania.

Shivers, Charles, cor. Seventh and Spruce streets, Philadelphia, Pa.

Shoemaker, Joseph L., cor. Sixth and Girard avenue, Philadelphia, Pa.

Shoemaker, Richard M., cor. Fourth and Race streets, Philadelphia, Pa.

Shrader, John L., Market street, Wappinger's Falls, N. Y.

Shreve, John A., Port Gibson, Miss.

Shriver, Henry, No. 53 Baltimore street, Cumberland, Md.

Shryer, Thomas W., No. 103 Baltimore street. Cumberland, Md.

Shryock, Allen, No 1213 Green street, Philadelphia, Pa

Shurtleff, Israel A., No. 39 Elm street, New Bedford, Mass.

Simmon, Karl, Saint Paul, Minn.

Simms, Giles G. C., No. 1344 New York avenue, Washington, D. C.

Simpson, William, No. 33 Fayetteville street, Raleigh, N. C.

Simpson, William, No. 609 Davis street, San Francisco, Cal.

Simson, Francis C., care of Brown & Webb, Halifax, N. S.

Simpers, J. Wilmer, cor. Thirteenth street and Columbia avenue, Philadelphia, Pa.

Sitton, Charles E, No. 151 First street, Portland, Oregon.

Skelly, James T., No. 339 East Fourth street, New York

Sloan, George W., Nos. 7 and 9 East Washington st., Indianapolis, Ind.

Slocum, Frank L., 3 Broglie Platz, Strassburg, Germany.

Smalley, Elijah, No. 271 Harrison avenue, Boston, Mass.

Smenner, J. Edwin, New Wilmington, Pa

Smith, Arthur G., Belvidere, N. J.

Smith, Auburn, London, O.

Smith, Charles B., No. 861 Broad street, Newark, N J.

Smith, Israel P., No. 324 Bank street, Newark, N. J.

Smith, Joseph S, 193 S. Howard street, Akron, O.

Smith, Linton, cor Seventh and Market streets, Wilmington, Del.

Smith, Samuel H., Liberty street, Winston, N. C.
Smith, Willard, Rochester, N. Y.
Smith, Willard A., Main street, Richfield Springs, N. Y.
Smither, Charles, 585 Niagara street, Buffalo, N. Y.
Smyser, William C., Virginia avenue, Windsor, Shelby Co., Ill.
Sniteman, Charles C., Neillsville, Wis.
Snow, Charles W., No. 28 East Genesee street, Syracuse, N. Y.
Snow, Jesse W., No. 23 Charles street, Boston, Mass.
Snyder, Alva L., No. 33 Court Square, Bryan, O.
Snyder, Ambrose C., cor. Court and Atlantic avenue, Brooklyn, N. Y.
Sombart, John E., Boonville, Mo.
Somers, Frank G., No. 125 State street, Chicago, Ill.
Somers, George H , Canton, O
Sommers, Richard M , No. 514 Birkley street, Camden, N. J.
Spalding, Warren A., No. 19 Church street, New Haven, Conn.
Spannagel, Charles C., No. 1607 Ridge avenue, Philadelphia, Pa.
Spenzer, Peter I., No. 88 Garden street, Cleveland, O.
Sperry, Herman J., 151 Chapel street, New Haven, Conn.
Squibb, Edward R., No. 56 Doughty street, Brooklyn, N. Y.
Stacy, Benjamin F., No. 51 Vine street, Charlestown, Mass.
Stahler, William, Norristown, Pa.
Staley, Michael S., Indianapolis, Ind.
Stamford, William H., No. 256 Mulberry street, Newark, N. J.
Standford, W. A , Florence, Kan.
Stanford, James W., Cuthbert, Ga.
Stanley, E. C., No. 6 Beach avenue, Auburn, N. Y.
Stanley, Frederick P., Atlanta, Ga.
Starr, Thomas, cor. Ninth avenue and Twenty-eighth street, New York.
Steele, Henry, N. E. cor. Turk and Taylor streets, San Francisco, Cal.
Steele, James G., No. 316 Kearney street, San Francisco, Cal.
Stein, Jacob H., No. 803 Penn street, Reading, Pa.
Steinhauer, Frederick, Denver, Colorado.
Stevens, Luther F., No. 207 Atlantic avenue, cor. Court street, Brooklyn, N. Y.
Still, Allen H., 60 Cedar street, N. Y.
Stoddart, Thomas, 84 E. Seneca street, Buffalo, N. Y.
Stowell, Daniel, No. 1045 Washington street, Boston, Mass.
Strachan, William E., No. 619 Third avenue, Brooklyn, N. Y.
Strassel, William, cor. Shelby and Broadway, Louisville, Ky.
Stuart, E. B , 233 Fifth street, Chicago, Ill.
Sturtevant, T. Frank, Wyandotte, Kan.
Sutton, Peter P., cor. Floyd and Market streets, Louisville, Ky.
Sweet, Caldwell, Bangor, Me.
Sweet, Frederick K., No. 2 Main street, Lockport, N. Y.
Sweet, Henry, cor. Kinsie and Desplaines streets, Chicago, Ill.
Tarrant, Homer P., Newberry Courthouse, S. C.
Tartis, Alfred J., No. 62 Broadway, E. D., Brooklyn, N. Y.
Taylor, Alfred B , No. 31 South Eleventh street, Philadelphia, Pa.
Taylor, Henry B., No. 1306 Girard avenue, Philadelphia, Pa.
Taylor, James H., No. 104 Thames street, Newport, R. I.
Taylor, John P., No. 99 Third street, New Bedford, Mass.
Taylor, Walter A., No. 9 Peachtree street, Atlanta, Ga.
Test, Alfred W., cor. Second and Federal streets, Camden, N. J.
Thatcher, Joseph H , No. 12 Market street, Portsmouth, N H.
Thatcher, Hervey D , No. 12 Market Square, Potsdam, N Y.
Thayer, Frederick A , No. 134 South Halsted street, Chicago, Ill.
Thayer, Henry, No. 150 Broadway, Cambridgeport, Mass.

Thibodeaux, Joseph G., Main street, Thibodeaux, La.

Thomas, James, Jr., opposite Maxwell House, Nashville, Tenn.

Thompson, Edward W., No 181 Main street, New Britain, Conn.

Thompson, Thomas C., Galveston, Texas.

Thompson, William B., No. 1700 Mount Vernon street, Philadelphia, Pa.

Thompson, William P., No. 5 West Baltimore street, Baltimore, Md.

Thompson, William S., No. 705 Fifteenth street, Washington, D. C.

Thompson, William S., No. 5 West Baltimore street, Baltimore, Md.

Thomsen, John J., Nos. 14 and 16 German street, Baltimore, Md.

Thorn, Henry P., Medford, N. J.

Thorp, Abner, N. W. cor. Court and Plum streets, Cincinnati, O.

Thurber, Almon R., No. 134 Main street, Ashtabula, O.

Tiarks, Hermann, First street, Monticello, Iowa.

Tibbs, William H., No. 235 Main street, Buffalo, N. Y.

Tidball, Walton C., New York.

Tiernan, Frank M., Mansion House, Roselle, N. J.

Tilden, Henry A., New Lebanon, N.Y.

Tilyard, Charles S., cor. Green and Franklin streets, Baltimore, Md.

Timberlake, Arthur, cor. College avenue and Seventh street, Indianapolis, Ind.

Tindall, Graham McF., No. 61 Commercial street, Aberdeen, Miss.

Tobey, Charles W., Troy, O.

Tomfohrde, John W., cor. Benton and West Eighteenth sts., St. Louis, Mo.

Tompkins, Orlando, Boston Theatre, Boston, Mass.

Tooker, Wm. W., Sag Harbor, N. Y.

Topley, James, No. 166 Georgia street, Vallejo, Solano Co., Cal.

Toplis, Robert J., Getty Square, Yonkers, N. Y.

Tower, Levi, Jr., No. 1681 Washington street, Boston, Mass.

Townley, William W, No. 765 Broad street, Newark, N. J.

Townsend, Abram R., Boone, Iowa.

Trask, Charles M., No. 21 Pleasant street, Boston, Mass.

Trimble, Henry, cor. Fifth and Callowhill streets, Philadelphia, Pa.

Troth, Samuel F., No. 1019 Cherry street, Philadelphia, Pa.

Troupe, Theodore, Springfield, O.

Tscheppe, Adolph, No. 1010 Third avenue, New York city.

Tufts, Charles A., No. 25 Washington street, Dover, N H.

Turner, George H., No. 296 South Pearl street, Albany, N. Y.

Turner, T. Larkin, No. 390 Tremont street, Boston, Mass.

Turnley, Pryor L., No. 3 Choice Hotel, Rome, Ga.

Tuska, David, Second avenue and 86th street, New York.

Twombly, John H, Masonic Block, Main st., Newmarket, New Hampshire.

Tyson, Samuel E, No. 141 West street, Georgetown, D. C.

Ubert, Julius C, cor. Lee and Division streets, Brooklyn, N. Y.

Ude, George, No. 3610 North Tenth street, St. Louis, Mo.

Uhlich, Ferdinand G., 1401 Salisbury street, St. Louis, Mo.

Underhill, George F., cor. Main and School streets, Concord, N. H.

Underhill, Joseph G., No. 397 Classon avenue, Brooklyn, N. Y.

Underhill, William H., Haverhill, Mass.

Underwood, Charles G., cor. Lewis street and Maverick Square, Boston, Mass.

Urban, Jacob P., 356 Ontario street, Cleveland, O.

Van Antwerp, Garet, No. 71 Dauphin street, Mobile, Ala.

Van Auken, Jerrie A., No. 125 Main street, Gloversville, N. Y.

Vandegrift, John A., No. 69 High street, Burlington, N. J.

Vander Emde, Reinhold, No. 323 Bowery, New York

Vandervoord, Ransford W., No. 482 Broad street, Newark, N. J.

Van Patten, William J., College street, Burlington, Vt.

Vansant, Robert H., Pitman avenue, Ocean Grove, N. J.

Van Winkle, Abraham W., No. 35 Clinton avenue, Newark, N. J.

Vars, Enoch W., Main street, Niantic, R. I.

Vaupel, Charles P., Cleveland, O.

Venable, Richard H., Third street and Public Square, Bardstown, Ky.

Verner, James, No. 235 Woodward avenue, Detroit, Mich.

Vickery, William H., S. W. cor. Central and Orchard sts., Dover, N. H

Vilter, Herman, McMicken avenue and Locust street, Cincinnati, O.

Vincent, William, No. 117 Broadway, Brooklyn, E. D., N. Y.

Voelcker, Rudolph, 217 Market street, Galveston, Texas.

Vogelbach, Herman A , Philadelphia, Pa.

Vogeler, Adolph G., No. 56 West Randolph street, Chicago, Ill.

Voorhees, William H., No. 21 Front street, Plainfield, N. J.

Vordick, August H., S. E. cor. Jefferson avenue and Benton street, St. Louis, Mo.

Vreeland, Cyrus E., Main street, near Washington, Orange, N. J.

Vreeland, Phrank, No. 200 Stockton street, San Francisco, Cal.

Wagner, Henry, cor. Fourth and Elm streets, Cincinnati, O.

Wahmhoff, J. H., Delphos, O.

Wakefield, Seth D., No. 72 Lisbon street, Lewiston, Me.

Walbrach, Arthur, Denver, Col.

Walch, Robert H., No. 1412 Walnut street, Philadelphia, Pa.

Walker, Anselle, Freehold, N. J.

Walker, Charles, Hannibal, Mo.

Walker, Francis W., Jr., New Brighton, Pa.

Walker, George, Girard, Kan.

Walker, William J., No. 74 State street, Albany, N. Y.

Wallace, A. C., Main street, Bellefontaine, O.

Wallace, Austin E., No. 1 Goodrich Block, Nashua, N. H.

Walton, Harry C., Laurel and Cutter streets, Cincinnati, O.

Wanier, George S., No. 407 Eighth avenue, New York.

Wardell, Robert C., Battle Creek, Mich.

Warne, Henry L., Whitewater, Wisconsin.

Warner, William R , No. 1228 Market street, Philadelphia, Pa.

Warrington, Charles W., cor. Fifth and Callowhill streets, Philadelphia, Pa.

Waugh, George J , Stratford, Ontario, Can.

Wayne, Edward S., No. 146 Broadway, Cincinnati, O.

Weaver, Charles A., cor. Fifth and Walnut streets, Des Moines, Iowa.

Weaver, J. Thornton, No. 1341 Ridge avenue, Philadelphia, Pa.

Weaver, James, Hanover Square, New York.

Weaver, John A., No. 210 Madison avenue, Easton, Pa.

Webb, John A., No. 210 Madison avenue, Baltimore, Md.

Webb, McHenry, Powers House, Columbia, Mo.

Webb, William H., No. 556 North Sixteenth street, Philadelphia, Pa.

Webber, Joseph T., cor. Main and State streets, Springfield, Mass.

Weber, William, cor. Fifteenth and Thompson streets, Philadelphia, Pa.

Webster, Stephen, No. 63 Warren avenue, Boston, Mass.

Weichsel, Franz, 602 Pearl street, Cleveland, O.

Weidemann, Charles A., No. 563 North Twenty-second street, Philadelphia, Pa.

Weinman, Oscar C., No. 173 Seventh avenue, N. Y.

Weiser, Albert, cor. St. Paul and Main streets, St. Paul, Minn.

Weiser, Emilius I., Fort Dodge, Iowa.

Weismann, Augustus W., No. 257 Broome street, New York.

Welch, Leonard E., cor. Broad and Washington streets, Albany, Georgia.

Wellcome, Henry S., No. 8 Snowhill, London, Eng.

Wells, Charles W., New Haven, Conn.

Wells, Ebenezer M., Houston street, Fort Worth, Texas.

Wells, Jacob D., cor. Fourth street, and Central avenue, Cincinnati, O.

Wells, Romanta, No. 297 State street, New Haven, Conn.

Wendel, Henry E., cor. Third and George streets, Philadelphia, Pennsylvania.

Wendler, Robert F. W., No. 404 Atlantic avenue, Brooklyn, N. Y.

Wenzell, William T., 852 Market street, San Francisco, Cal.

Weusthoff, Otto S., 212 E. Third street, Dayton, O.

Whall, Joseph S., No. 82 Hancock street, Quincy, Mass.

Wharton, John C., No. 38 Union street, Nashville, Tenn.

Wharton, William H., No. 38 Union street, Nashville, Tenn.

Wheeler, C. Gilbert, University of Chicago, Chicago, Ill.

Wheeler, *Lucian F.*, Waldo, Fla.

WHITE, AARON S., No. 59 High street, Mount Holly, N. J.

White, George H , Jersey City, New Jersey.

White, Philip A., No. 102 Gold street, New York

Whitfield, Thomas, No. 240 Wabash avenue, Chicago, Ill.

Whiting, Frederick T., Main street, Great Barrington, Mass.

Whitman, Nelson S., No. 3 Merchants' Exchange, Nashua, New Hampshire.

Whitney, Henry M., cor. Essex and Lawrence streets, Lawrence, Mass.

Wichelus, Frederick, Bowery and Fourth street, New York.

Wickham, William H., No. 91 Fulton street, New York.

Wiegand, Thomas S., No. 528 Arch streets, Philadelphia, Pa.

Wienges, Conrad, cor. Coles and Fourth street, Jersey City, N. J.

Wigert, Carl R., No. 213 Jefferson street, Burlington, Iowa.

Wike, Albert D., No. 8 Market street, Marietta, Pa.

Wilcox, Frederick, Apothecaries' Hall, Exchange Place, Waterbury, Conn.

Wilder, Graham, No. 181 Main street, Louisville, Ky.

Wilder, Hans M., 84 Eighteenth street, Detroit, Mich.

Williams, Duane B., Worcester, New York.

Williams, John K., No. 391 Main street, Hartford, Conn.

Williams, Richard J. C., 2 Union Block, Cambridge, N. Y.

Williams, William H., 659 Main street, Wheeling, W. Va.

Williamson, E. J., Ninth and Franklin streets, St. Louis, Mo.

Wilson, Benjamin O., Nos. 18 and 20 Central street, Boston, Mass.

Wilson, Julius H., No. 189 Maxville street, Chicago, Ill.

Wilson, William, 106 Broadway, cor. Pine street, New York.

Wingate, Jeremiah Y., S. E. cor. Silver and Locust streets, Somersworth, N. H.

Winkleman, John H., cor. Liberty and German streets, Baltimore, Maryland.

Winslow, Edwin C., 107 Main street, Danville, Ill.

Winslow, Samuel W., No. 33 Kingston street, Boston, Mass.

Winter, Jonas, No. 81 West Franklin street, Hagerstown, Md.

Witte, Edward, No. 4128 Broadway, St Louis, Mo.

Wohlfarth, Justin, 2002 Third avenue, New York.

Wolfe, Nathaniel, 213 Market street, Wilkesbarre, Pa.

Woltersdorf, Louis, No. 171 Blue Island avenue, Chicago, Ill.

Wood, Alonzo F., No. 2 Church street, New Haven, Conn.

Wood, Edward S., 14 Chauncey street, Cambridge, Mass.

Woodbridge, George W., No. 2 Faneuil Hall Square, Boston, Mass.

Woodman, Warren H., Danvers, Mass

Woodruff, Roderick S., No. 91 Bank street, Waterbury, Conn.

Woodward, Samuel M., No. 91 North Charles street, Baltimore, Md.

Worthington, J. Willits, Main street, Moorestown, N. J.

Wright, Archibald W., cor. Front and Market streets, Philadelphia, Pa.

Wright, William R., No. 33 Kingston street, Boston, Mass.

Wynn, William, No. 496 Fulton street, Brooklyn, N. Y.

Yatman, John L., Orange Valley, N. J.

Yeakel, Nathan W., 107 and 109 Columbia street, Lafayette, Ind.

Yonge, St. John R., Savannah, Ga.

Yorston, Matthew M., No. 429 Central avenue, Cincinnati, O.

Young, Alexander N., No. 103 Sixteenth street, Wheeling, W. Va.

Young, John E., No. 3 Sherman's Block, Vergennes, Vt.

Young, Judson J., Kansas City, Mo.

Zahn, Emil A., 1801 State street, Chicago, Ill.

Zeilin, John H., No. 512 Cherry street, Philadelphia, Pa.

Zeller, William S., Bellefonte, Centre Co., Pa.

Zellhœfer, George, No. 91 Fulton street, New York.

Ziegler, Philip M., No. 526 Penn street, Reading, Pa.

Zimmerman, Charles, Peoria, Ill.

Zoeller, E. V., Tarboro, N. C.

Zwick, George G., cor. Eleventh and Meridian streets, Covington, Kentucky.

LIST OF DECEASED MEMBERS.

HONORARY MEMBERS.

		Elected.	Died.
Bache, Franklin, M.D.,	Philadelphia, Pa.,	1857	1864
Bailey, Montgomery J., M.D.,	New York,	1856	1873
Boullay, Pierre François Guillaume,	Paris, France,	1868	1869
Casselmann, Arthur, Ph.D.,	St. Petersburg, Russia,	1868	1872
Chevallier, Alphonse, M.D.,	Paris, France,	1871	1879
Deane, Henry,	London, England,	1868	1874
Durand, Elias,	Philadelphia, Pa.,	1857	1873
Farrington, Thomas,	Boston, Mass.,	1856	1867
Hanbury, Daniel,	London, England,	1868	1875
Ludwig, Hermann, Ph.D.,	Jena, Germany,	1871	1873
Mohr, Frederick, Ph.D.,	Bonn, Germany,	1868	1879
Robinet, Stephane,	Paris, France,	1868	1869
Wiggers, H. August L., Ph.D.,	Göttingen, Germany,	1877	1880
Wood, George B., M.D.,	Philadelphia, Pa.,	1857	1878

ACTIVE MEMBERS.

		Elected.	Died.
Aimar, George Washington,	Charleston, S. C.,	1874	1877
Anderson, James H.,	New York,	1859	1866
Andrews, George Wansay (President 1856–57),	Baltimore, Md.,	1856	1877
Aspinwall, James S.,	New York,	1855	1874
Atwood, Charles Henry,	Boston, Mass.,	1856	1877
Bache, Charles L.,	San Francisco., Cal.,	1852	1854
Backus, James William,	Marine City, Mich.,	1867	1870
Badger, Charles William,	Newark, N. J.,	1870	1877
Balmer, James,	Baltimore, Md.,	1856	1866
Barry, John William,	Baltimore, Md.,	1856	1861
Baylis, William E. P.,	Brooklyn, N. Y.,	1860	1872
Baynon, John,	Shreveport, La.,	1858	1862
Beam, Isaac Richard,	Baltimore, Md.,	1873	1879
Bell, Alexander C.,	Chicago, Ill.,	1879	1881
Bell, Gotthold E.,	Louisville, Ky.,	1874	1879
Benzinger, John Sylvester,	Baltimore, Md.,	1860	1869
Bertolett, William John,	Shreve, O.,	1872	1877
Bidwell, Marshall Spring,	Elmira, N. Y.,	1871	1877
Bigelow, Francis O.,	Medford, Mass.,	1859	1863
Billings, Samuel J.,	New York,	1860	1865
Bingham, John Calvin,	St. Johnsbury, Vt.,	1853	1870

		Elected.	Died.
Blair, Henry C.,	Philadelphia, Pa.,	1855	1862
Blauw, Hippolyt Anton,	Rochester, N. Y.,	1856	1870
Bowman, Henry K.,	Philadelphia, Pa.,	1869	1873
Boyden, Ashel,	Boston, Mass.,	1853	1877
Bright, James Evesson,	Worcester, Mass.,	1868	1872
Bringhurst, Ferris,	Wilmington, Del.,	1862	1871
Brown, John T.,	Boston, Mass.,	1859	1860
Brown, William,	Boston, Mass.,	1858	1875
Canavan, Benjamin,	New York, N. Y.,	1855	1857
Carney, Charles Tibbets,	Boston, Mass.,	1853	1862
Caspari, Charles,	Baltimore, Md.,	1856	1870
Catlin, Thereon,	St. Louis, Mo.,	1871	1880
Chapman, William B. (Pres. 1854–55),	Cincinnati, O.,	1852	1874
Cherot, Leonce,	Memphis, Tenn.,	1865	1879
Churchill, George Washington,	Chelsea, Mass.,	1865	1869
Cleney, William F.,	Cincinnati, O.,	1859	1865
Coddington, Isaac,	New York, N. Y.,	1855	1874
Colby, Moses D.,	Boston, Mass.,	1859	1870
Coon, Walter S.,	New York, N. Y.,	1858	1861
Coppuck, Peter Van Peet,	Mount Holly, N. J.,	1857	1869
Cressman, Noah,	Waterloo, Canada West,	1863	1864
Cunningham, James E.,	Pittsburg, Pa.,	1860	1863
Cushman, Alexander,	New York, N. Y.,	1858	1861
Daggett, Alfred, Jr.,	New Haven, Conn.,	1865	1878
Dalrymple, Charles Hoagland,	Morristown, N. J.,	1860	1882
Davies, Robert J.,	Brooklyn, N. Y.,	1858	1872
De Motte, Henry Augustus,	Jersey City, N. J.,	1871	1873
D'Evers, Henry Gaston,	Chicago, Ill.,	1865	1870
Dodge, John P.,	New York, N. Y.,	1865	1873
Dover, Thomas,	Dayton, O.,	1879	1881
Dunk, Alfred A.,	East Saginaw, Mich.,	1867	1879
Easterbrook, Ray B.,	New York, N. Y.,	1858	1868
Ellis, Charles (Pres. 1857–58),	Philadelphia, Pa.,	1852	1873
Emanuel, Louis M.,	Linwood, Pa.,	1857	1868
Erben, John S.,	Philadelphia, Pa.,	1868	1881
Everson, John C.,	Philadelphia, Pa.,	1863	1872
Eyster, Christopner Edward,	Yankton, Dak.,	1871	1877
Faber, John,	New York, N. Y.,	1857	1881
Fish, George Brewster,	Saratoga Springs, N. Y.,	1860	1866
Fish, Henry Ferdinand,	New York, N. Y.,	1852	1868
Foley, James Thomas,	Houston, Tex.,	1878	1879
Folger, William Swain,	Boston, Mass.,	1875	1878
Forester, Richard,	Brooklyn, N. Y.,	1860	1862
Frohwein, Max,	New York, N. Y.,	1865	1877
Frost, John Johnson,	Lexington, Ky.,	1874	1880
Fulton, John Culpepper P.,	Brooklyn, N. Y.,	1873	1874
Gabaudan, Arthur W.,	New York, N. Y.,	1862	1870
Gaither, Francis Singleton,	Washington, D. C.,	1860	1876
Gay, William,	Cambridgeport, Mass.,	1858	1862
Geiger, Conrad John,	Canton, O.,	1866	1876
Gerhard, John C.,	Cincinnati, O.,	1862	1865

		Elected.	Died.
Geyer, Andrew,	Boston, Mass.,	1853	1855
Gilman, Samuel Kensman, Jr.,	Boston, Mass.,	1876	1879
Gleeson, James Andrew,	Boston, Mass.,	1859	1880
Gleeson, Michael Henry,	Boston, Mass.,	1859	1879
Goodwin, William W.,	Newburyport, Mass.,	1853	1877
Graeffe, Frederick Alexander,	Baltimore, Md.,	1870	1873
Green, Thomas Townsend,	Poughkeepsie, N. Y.,	1858	1880
Griswold, William Henry,	North Adams,	1874	1879
Groneweg, Louis,	Cincinnati, O.,	1864	1866
Haddox, James Bowling,	Nashville, Tenn.,	1876	1880
Harbaugh, Valentine,	Washington, D. C.,	1856	1871
Hazard, Peter J.,	Philadelphia, Pa.,	1853	1876
Hegeman, Frederick Augustus,	New York, N. Y.,	1855	1860
Hegeman, William,	New York, N. Y.,	1858	1875
Henchman, Daniel,	Boston, Mass.,	1853	1878
Hensch, Hugo,	Cleveland, O.,	1872	1873
Hendel, Samuel Douglass,	St. Louis, Mo.,	1858	1871
Heydenreich, Frederick Victor,	Brooklyn, N. Y.,	1860	1879
Hill, Henry E.,	Detroit, Mich.,	1866	1868
Hollis, Thomas,	Boston. Mass.,	1853	1875
Homann, James W.,	New York, N. Y.,	1875	1875
Howard, George Montgomerie,	Washington, D. C.,	1871	1877
Howarth, James L.,	Atlanta, Ga.,	1877	1881
Hughes, Henry Arnold,	Louisville, Ky.,	1857	1876
Hunt, Henry H.,	Balston Spa, N. Y.,	1876	1877
James, Thomas P.,	Cambridge. Mass.,	1857	1882
Jardella, Jerome B.,	Vincennes, Ind.,	1865	1870
Jenkins, William Ellis,	Boston, Mass.,	1865	1869
John, Frederick L.,	Philadelphia, Pa.,	1856	1864
Johnston, Charles Pearson,	Memphis, Tenn.,	1868	1873
Junghanns, Charles A.,	Cincinnati, O.,	1858	1862
Keffer, Frederick A.,	New Orleans, La.,	1862	1873
Kennedy, Robert Chauncey,	Cleveland, O.,	1865	1868
Kent, Ashbury,	Cincinnati, O.,	1854	1860
Kent, William,	Cincinnati, O.,	1864	1867
Kettell, George P.,	Charlestown, Mass.,	1867	1881
Kidder, Darius B.,	Boston, Mass.,	1858	1874
King, Alexander,	Buffalo, N. Y.,	1874	1876
King, Henry,	New York, N. Y.,	1858	1867
Knapp, Edwin Ezra,	Norwalk, Conn.,	1860	1862
Kolp, Christopher Henry,	Philadelphia, Pa.,	1876	1878
Krebs, Hugo,	St. Louis, Mo.,	1871	1880
Krummeck, Jacob,	Santa Fé, New Mexico,	1867	1878
Laidley, Joseph,	Richmond, Va.,	1852	1861
Lancaster, Thomas A.,	Philadelphia, Pa.,	1859	1875
Lane, Alfred S.,	Rochester, N. Y.,	1857	1881
Lane, James Bacheller,	Fitchburg, Mass.,	1856	1867
Leitch, Alexander,	St. Louis, Mo.,	1858	1868
Lewis, Thomas,	Brooklyn, N. Y.,	1867	1880
Lineaweaver, Kline Cyrus,	Washington, D. C.,	1864	1873

		Elected.	Died.
Lingelbach, Ferdinand,	Louisville, Ky.,	1874	1879
Little, William B.,	Panama, U. S. Colombia,	1857	1867
Longshaw, William, Jr.,	Bayou Sara, La.,	1858	1864
Lyman, Benjamin,	Montreal, Can.,	1875	1878
Lyman, Stephen J.,	Montreal, Can.,	1875	1879
Lyon, Charles H., Jr.,	Boston, Mass.,	1858	1871
McBride, James,	St. Louis, Mo.,	1864	1871
McConville, Michael Stanislaus,	Worcester, Mass.,	1859	1873
McDonald, John,	Brooklyn, N. Y.,	1860	1861
McIntyre, Timothy Caldwell,	Washington, D. C.,	1858	1862
McKay, George Johnson,	Eureka, Cal.,	1864	1880
McPherson, George B.,	Cincinnati, O.,	1867	1871
Mallinckrodt, Gustavus,	St. Louis, Mo.,	1869	1877
Massott, Eugene Leo,	St. Louis, Mo.,	1857	1871
Matt, Joseph,	Columbus, O.,	1872	1874
Mattern, Jonathan Cunningham,	Pittsburg, Pa.,	1860	1876
Maxwell, James T.,	New York, N. Y.,	1855	1860
Mayer, Ferdinand F.,	New York, N. Y.,	1859	1869
Meade, Richard Hardaway,	Richmond, Va.,	1873	1880
Meakim, John (Pres. 1855–56),	New York, N. Y.,	1852	1863
Melzar, Augustus P.,	Wakefield, Mass.,	1856	1874
Menard, Alexander Ambrose,	Macon, Ga.,	1877	1881
Merrick, John Mudge,	Boston, Mass.,	1875	1879
Metcalf, Tristam W.,	Brooklyn, N. Y.,	1857	1873
Milhau, John (Pres. 1867–68),	New York, N. Y.,	1855	1874
Muller, William Henry,	Chicago, Ill.,	1865	1870
Mundy, William Chester,	Seneca Falls, N. Y.,	1880	1881
Nagle, John George,	Baltimore, Md.,	1863	1869
Nairn, Joseph Wilson,	Washington, D. C.,	1858	1875
Nadand, James W.,	Cincinnati, O.,	1864	1868
Neate, William Isaac Collier,	Olympia, W. T.,	1880	1881
Neergaard, J. William,	New York, N. Y.,	1859	1880
Norgrave, Samuel Kramer,	Pittsburg, Pa.,	1857	1871
Oliffe, William J.,	New York, N. Y.,	1858	1866
O'Brien, Joseph C.,	Baltimore, Md.,	1863	1873
Osborn, William Henry,	Baltimore, Md.,	1870	1881
Osgood, Samuel W.,	Davenport, Iowa,	1858	1860
Palmer, Albert Gallatin,	Washington, D. C.,	1858	1860
Parker, Herschel,	Brooklyn, N. Y.,	1867	1870
Parrish, Edward (Pres. 1868–69),	Philadelphia, Pa.,	1852	1872
Patten, John Frederick,	Bangor, Me.,	1871	1881
Peck, Samuel P.,	Bennington, Vt.,	1853	1859
Pettis, Newton C.,	North Adams, Mass.,	1868	1874
Philbrick, Serem Parsons,	Boston, Mass.,	1852	1859
Phillips, Lewellyn,	Baltimore, Md.,	1856	1865
Pile, Wilson Hunt,	Philadelphia, Pa.,	1857	1881
Platzer, Robert,	Philadelphia, Pa.,	1865	1874
Polhemus, James L.,	Sacramento, Cal.,	1866	1867
Pollard, Charles P.,	Marysville, Cal.,	1859	1869
Porter, Henry Clinton,	Towanda, Pa.,	1869	1877
Preston, Alfred, Jr.,	Portland, Me.,	1873	1879

		Elected.	Died.
Procter, William, Jr. (Pres. 1862–63),	Philadelphia, Pa.,	1852	1874
Pyle, J. Lindley,	Brooklyn, N. Y.,	1859	1866
Rehfuss, Lewis,	Cincinnati, O.,	1854	1856
Reifsnider, William Edward,	Baltimore, Md.,	1864	1872
Reinold, Bernard H.,	New York, N. Y.,	1861	1876
Ricker, George Dexter,	Boston, Mass.,	1858	1881
Rideout, James William,	Brooklyn, N. Y.,	1875	1880
Ritson, Alfred,	Columbus, O.,	1870	1879
Roberts, David,	Boston, Mass.,	1858	1863
Rollmann, Frederick,	Philadelphia, Pa.,	1862	1864
Roemer, Daniel,	Cincinnati, O.,	1865	1870
Ross, George,	Lebanon, Pa.,	1878	1880
Sands, Jesse M.,	New York, N. Y.,	1860	1867
Schmidt, Henry,	New York, N. Y.,	1874	1875
Schmidt, William George,	Louisville, Ky.,	1874	1877
Scott, David,	Worcester, Mass.,	1855	1878
Scott, John,	Cincinnati, O.,	1854	1873
Scully, Harmar Denny,	Pittsburg, Pa.,	1858	1866
Selfridge, Matthew Merthirall,	Philadelphia, Pa.,	1858	1881
Smith, Charles Augustus,	Cincinnati, O.,	1852	1862
Smith, Edward Alexander,	Baltimore, Md.,	1870	1875
Smith, Edwin R.,	Monmouth, Ill.,	1862	1869
Smith, John William,	Norfolk, Va.,	1873	1876
Smith, Samuel A.,	Newburyport, Mass.,	1859	1874
Snowdon, George M.,	Philadelphia, Pa.,	1857	1879
Squire, William Henry,	Germantown, Pa.,	1862	1865
Stabler, Rich. Hartshorne (Pres. 1870–71),	Alexandria, Va.,	1856	1878
Steiner, Henry,	Philadelphia, Pa.,	1857	1858
Stephens, William Gibson,	Yonkers, N. Y.,	1860	1878
Stevens, Ashbel Mead,	Cincinnati, O.,	1854	1860
Stevens, Rufus Walker,	Somersworth, N. H.,	1859	1868
Suding, Henry Aloysius,	Baltimore, Md.,	1870	1875
Sweetser, Thomas Augustus,	South Danvers, Mass.,	1859	1860
Taylor, Robert James,	Newport, R. I.,	1859	1871
Taylor, William,	Philadelphia, Pa.,	1868	1871
Thomas, William,	Jersey City, N. J.,	1856	1856
Tulley, Andrew J.,	New York, N. Y.,	1862	1875
Uhl, Charles,	Memphis, Tenn.,	1860	1873
Waite, Samuel Brett,	Washington, D. C.,	1858	1862
Warren, Charles Henry,	Brandon, Vt.,	1872	1876
Warren, William,	Brighton, Mass.,	1867	1871
Watson, William J.,	Brooklyn, N. Y.,	1853	1872
Weyman, George Washington,	Pittsburg, Pa.,	1858	1864
White, Daniel Fuller,	Charlestown, Mass.,	1859	1864
White, William P.,	Chicago, Ill.,	1865	1866
Whitehead, Silas,	Lynchburg, Va.,	1856	1858
Wilkins, Daniel Gilbert,	Boston, Mass.,	1865	1880
Willard, Joseph,	Chicago, Ill.,	1865	1878
Wilson, Adam Hill,	Philadelphia, Pa.,	1859	1880
Wilson, George C.,	Boston, Mass.,	1859	1861
Wiseman, Charles,	Baltimore, Md.,	1856	1862

		Elected.	Died.
Witzell, Louis,	Cincinnati, O.,	1864	1867
Wood, Gilbert Davidge,	Baltimore, Md.,	1856	1863
Woods, Samuel H.,	Boston, Mass.,	1859	1869
Wright, George,	New York, N. Y.,	1869	1873

LIST OF RESIGNATIONS.

Names.	Residence.	Elected.
†Abel, Joseph,	Pittsburg, Pa.,	1864
‡Althans, Charles H.,	Brooklyn, N. Y.,	1873
§Blinkhorn, George,	Philadelphia, Pa.,	1860
‡Candler, Asa G.,	Atlanta, Ga.,	1878
†Cramer, Henry,	Philadelphia, Pa.,	1867
†Dimock, Robert H.,	New Haven, Conn.,	1876
§Jauncey, William,	Chicago, Ill.,	1873
§Lawler, Charles J.,	Brooklyn, N. Y.,	1874
*Lindewald, William E.,	Stockholm, Sweden,	1877
§Mill, Samuel W.,	Chicago, Ill.,	1864
§Miller, Charles M.,	Mansfield, O.,	1878
§Sharp, Joseph P.,	Chicago, Ill.,	1865
§Strother, William A.,	Lynchburg, Va.,	1874
§Tozzer, Samuel C.,	Lynn, Mass.,	1875
‡Wood, Theodore B.,	Lexington, Ky.,	1879

LIST OF MEMBERS DROPPED FROM THE ROLL.

Names.	Residence.	Elected.
Abell, Russell,	Harrodsburg, Ky.,	1878
Albers, George W.,	Knoxville, Tenn.,	1872
Avis, James L.,	Harrisonburg, Va.,	1873
Baldus, William T.,	Washington, D. C.,	1872
Bannvart, Charles A.,	Unknown,	1856
Barr, Peter H.,	Canton, O.,	1867
Bischof, Albert L.,	New York,	1875
Boutelle, William E.,	Providence, R. I.,	1876
Bowman, James,	London, Ont.,	1876
Brigham, William C.,	Medford, Mass.,	1877
Brown, Alexander E.,	Baltimore, Md.,	1863
Brown, William H.,	Baltimore, Md.,	1863
Brumby, Robert T.,	Athens, Ga.,	1878

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* Left the Country.

† Left the business.

‡ Inability to attend the meetings.

§ No reason given.

Names.	Residence.	Elected.
Butler, Osceola,	Savannah, Ga.,	1878
Cady, Hiram W.,	Plattsburg, N. Y.,	1870
Connor, Louis M.,	Dallas, Texas,	1874
Coombs, Thomas R.,	Unknown,	1861
Cohen, Lewis,	Paris, France,	1877
Cotting, William A.,	Milledgeville, Ia.,	1869
Day, Walter D.,	New York,	1873
Dege, George F.,	New York,	1868
Ellis, William L. A.,	Hawkinsville, Ga.,	1878
Gardiner, Warren B.,	New York,	1860
Goodwyn, John U.,	Petersburg, Va.,	1873
Gray, Francis M.,	Hopkinsville, Ky.,	1876
Hankinson, Thomas S.,	Augusta, Ga.,	1878
Hatch, Frederick A.,	Pleasantville, Pa.,	1876
Heinitsh, Edward H.,	Columbia, S. C.,	1877
Heller, Peter H.,	Unknown,	1871
Hodge, Charles,	Portland, Oregon,	1859
Hoerner, Theodore,	Unknown,	1871
Holden, Henry C.,	Clinton, Mass.,	1870
Holt, Alvin E.,	Detroit, Mich.,	1873
Jagger, Charles H.,	Boston, Mass.,	1875
Jefferson, William E.,	Frederickton, O.,	1874
Keffer, William P.,	Unknown,	1866
Knowlson, Alexander M.,	Troy, N. Y.,	1875
Larwill, Joseph H., Jr.,	Unknown,	1858
Lee, Addison S.,	Raleigh, N. C.,	1873
Lee, Emmor H.,	Unknown,	1875
Mercein, James R.,	Jersey City, N. J.,	1865
McInall, Edward, Jr.,	Wilmington, Del.,	1867
Morgan, Young H.,	Cochran, Ga.,	1878
Morrison, Samuel C.,	Stanford, Conn.,	1871
Pauly, Christian,	Jersey City, N. J.,	1875
Petrie, Alexander B.,	Guelph, Ont.,	1867
Smith, Charles A.,	Springfield, O.,	1874
Sweeney, Robert C.,	St. Paul, Minn.,	1866
Wenck, George J.,	New York,	1869
Westerfield, Joseph H.,	New York,	1858
Willis, Joseph N.,	Richmond, Va.,	1873
Viallon, Paul L.,	Bayou Goula, La.,	1870

INDEX.